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THE COMMAND AND GENERAL STAFF SCHOOL QUARTERLY

REVIEW OF MILITARY LITERATURE

LIEUTENANT COLONEL P.R. DAVISON, *Editor*
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FOREWORD

The object of this publication is a systematic review of current military literature, through cataloging articles of professional value, in selected military and naval periodicals, in the domestic and foreign field.

Articles from foreign periodicals are treated by translations of titles and digests of contents; material of particular importance is covered more extensively in a section of "Abstracts of Foreign-language Articles."

A "Library Bulletin" Section lists books, recently accessioned, which are of particular significance.

This Quarterly is published as a guide to modern military tendencies and to inspire vigorous thought on the subjects treated.

The opinions expressed by authors are not necessarily official.

September, 1937

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Section 1

ORIGINAL MILITARY STUDY

SOLVING THE TACTICAL EQUATION

The Logical Foundation of the Estimate of the Situation

By Major T.R. Phillips, Coast Artillery Corps

What is the secret of success in war? Napoleon considered his methods so important that he was incensed when Jomini published his book *Treatise on Large Operations* because he feared that his opponents would learn and benefit by his methods explained therein. Later he remarked that it did not matter; the opposing commanders were too old to learn and by the time other commanders, better educated in youth, commanded armies, Napoleon would be dead.

"Strategy," Foch declared, "if susceptible of easy analysis, is not equally simple from the point of view of synthesis; though it may be easily understood after it has been practiced, it is not a simple thing to put into practice. What is required is the ability in special circumstances, *to estimate the situation as it exists*, shrouded in the mist of the unknown; the ability to form a sound judgment of the seen, to assess the unseen, to make a quick decision and thereupon to act vigorously without hesitation."

"Military science," Napoleon wrote, "consists in *carefully estimating* all the eventualities first, then in estimating exactly, almost mathematically, the degree of chance. It is on this point that you must make no mistake, for a decimal more or less can change everything. *Chance remains always a mystery for mediocre spirits and becomes a reality to superior men.*" And again: "I work constantly, *I estimate continually;* if I appear always ready to respond to everything, prepared to face anything, it is because before undertaking anything I have meditated a long time, I have foreseen all that could happen. It is not my guardian angel which reveals to me suddenly, in secret, what to say or do in a circumstance unexpected for others. It is reflection, meditation."

"It is unquestionably sometimes necessary," wrote Frederick the Great, in his Secret Instructions to his generals, "to take chances in war; but you have to avoid these hazards all you can by prudence . . . So the experience and history of all war tell us . . . It is a stupendous game of chance wherein he who *estimates best* wins in the end."

With astonishing unanimity the great leaders have spoken or written of the importance of estimation and calculation. What are the conditions under which this mental procedure takes place? Is it a flash on the field of battle? "An inspiration," said Marshal Soult, "is an estimate rapidly made." "Let us proceed in due order," Foch instructs. "I take a sheet of paper; I write. To write down point by point is an excellent thing for focusing one's thought. It clears the ground. . . . One must think it out, see the possibilities, calculate them, judge, decide, and then things move."

The process of thought must be objective. The commander must make the circumstances under which he is able to estimate his situation and prepare his plans for the future. "The rendering of decisions is the most important duty of commanders and is a responsibility which cannot be transferred." (*Combat Orders*, C. & G.S.S.) Horace Porter, in his book, *Campaigning with Grant*, shows how Grant created the conditions under which he could prepare his plans. "He talked less and thought more than anyone in the service. He studiously avoided performing any duty which someone else could do just as well or better than he, and in this respect demonstrated his rare powers of administration and executive methods. He was one of the few men holding high position who did not waste valuable hours by giving his personal attention to petty details. He never consumed his time in reading over courtmartial proceedings, or figuring up the items of supplies on hand, or writing unnecessary letters or communications. He held subordinates to strict accountability in the performance of such duties, and kept his own time for thought. It was this quiet but intense thinking, and the well matured ideas which resulted from it, that led to the prompt and vigorous action which was constantly witnessed during this year, so pregnant with events."

"On the 27th of August the situation was really agonizing. Dangers on every hand. We were in the dark. But he (Joffre) preserved his admirable calm. His example carried weight. Around him at his headquarters, despite bad news, there was

little anxiety, still less panic. Only a calm and placid atmosphere in which decisions were taken coolly." (*En Ecoutant le Marechal Foch*, by Ch. Bugnet.) The result of this objective thinking was the victory of the Marne. "At Bar-sur-Aube, where general headquarters was now (1 September, 1914) established, Joffre spent most of the day in an estimate of the situation. He concluded that all of his forces must continue to fall back until the Fifth Army had made good its escape. Joffre had resolved to have the chances on his side when he resumed the offensive. The result of the day's meditation was General Instruction No. 4. This prescribed the *limit* of the French retirement and foreshadowed an offensive in which all troops, including Manoury's Sixth Army, would be employed." (Tindall, "Will of the Leader," *Infantry Journal*, March-April 1937.)

What is the magic of the process of thought by which successful commanders have solved their problems? The generals of the past had no carefully considered outline to guide their thought. But the great generals were geniuses who instinctively went to the heart of their problems, who had "the ability to form a sound judgment of the seen, to assess the unseen." Napoleon constantly estimated his situation and usually reduced his estimates to writing. With reference to the situation in August, 1813, he wrote to the Secretary of War as follows:

> "It is reported that 60,000 men of the Russian and Prussian Army have entered Bohemia, and that Emperor Alexander arrived at Prague, the 15th. If this is the case:
>
> *First hypothesis:* Either the enemy will take the offensive by Zittau, the only exit that is on the right bank. He will be stopped by the forces at Zittau and the corps of General Vandamme, as well as by the reserve at Goerlitz that I can get there in a day and a half, or
>
> *Second hypothesis:* The enemy will manoeuver on the left bank of the Elbe and will debouch by Toeplitz and Peterswalde to advance on Dresden. In this case Marshal St. Cyr can assemble 60,000 men in two days, and in four days I can be there with 150,000. Finally,
>
> *Third hypothesis:* [Considered highly improbable by the Emperor, but not omitted by him.] The enemy may engage in operations that cannot be anticipated and will enter Germany, moving either by Munich or by Nurem-

berg. In this case, he will deliver all of Bohemia in my hands.

In case the report is in error: If on the contrary, the report of the entry of the Russian Army into Bohemia is false, or if there is but a small body of troops, then in two days I can concentrate 200,000 men against the enemy in Silesia.

Another improbable action: We shall now consider the case where the enemy, forgetting past lessons, may move with 40,000 men on Munich and 25,000 or 30,000 on Wurzburg, which would weaken him by 70,000. Here, then, is my plan so that you may give the necessary orders, etc."

In this letter, Napoleon analyzed five possible courses of action which might be open to the enemy in their relationship to the line of action he was then following, leaving no possible action they might take unconsidered.

The modern estimate has been evolved, first from development of Napoleon's methods by German students, and later by the application of rigorous logic to the problem. Most armies now use some outline as a suggestion for the commander. German, French and English directions are given in Appendices 2 to 4. The original American estimates seem to have been adapted from German methods but have departed from them since the World War. The American forms have gone through many changes and the outline for a Commander's Estimate of the Situation now in use at The Command and General Staff School varies materially from those in use during and after the World War. The tendency has been to return more closely to the Napoleonic method.

The Tactical Equation

The tactical or strategical equation to be solved in determining the decision is composed of:

a. The mission or object.

b. The variables. These are your own force and the hostile force.

c. The constants (arbitrary constants), such as:

Relative combat power

Terrain

Time and space
Dispositions
Status of supply, etc.

The solution of the equation is a synthesis of what will be done and the details by which it will be accomplished. Stated in military terms the solution consists of a basic decision to adopt a definite tactical or strategical method together with supplementary decisions dealing with the details of execution. The decision fundamentally consists of two subdivisions: first, what will be done; this implies selection of a tactical method, *e.g.*, attack, defense, pursuit, delaying action, etc.; and second, the details of time, place, organization of forces, employment of subdivisions of the command, etc.

The tactical methods by which military operations are conducted are simple and few in number. For example, offensive operations may be undertaken by a frontal attack, a close-in envelopment, a wide envelopment, a defensive-offensive sequence, etc., or by a combination of these methods. If the mission required offensive action, then the decision would consist first in the selection of one of the offensive types of tactical operations; and second, in determination of the time, place and details of execution of the method chosen.

The commander making an estimate is familiar with all the methods by which his force can operate; he also has a knowledge built up during the campaign of the enemy force and of the constants of the situation. His estimate consists of: first, determining the limitations imposed on the lines of action open to him and the enemy by the constant factors of the situation; and second, of the influence the enemy, within the limits imposed by the situation, can exercise to interfere with the lines of action open to him.

For example, in proceeding with the first part of his estimate, the commander's examination of the terrain may show that an operation in one locality is favored while in others it would be difficult. Time and space may permit operation a certain distance to the hostile rear, but no further within the time available. Dispositions of his troops may prevent operations against one flank or favor the other flank. The same factors will also limit the action of the enemy when studied from his point of view. As a result of this examination of the situation the commander determines the possible lines of action by which

he can accomplish his mission as well as all methods within the physical capabilities of the enemy to interfere. His second step, naturally, will be to attempt to foresee the effect of enemy interference on the course of action open to him. His foresight must embrace the possible like the probable. When he has carefully and methodically assessed the effect of the constant factors to favor or limit his lines of action and then has evaluated the ability of the enemy to interfere, he can make a decision which should be sound.

Various Solutions of the Tactical Equation

The foregoing example follows the sequence and logic used in the outline for a Commander's Estimate of the Situation in use at The Command and General Staff School at the present time. There are three general methods by which the equation can be solved reasonably.

(1) By consideration of the effect of the constants to limit the action of the variables. As a result of this consideration a statement is made of the reasonable lines of action open to your own forces and of all the courses of action within the physical capabilities of the enemy. These lines of action and capabilities are then placed in opposition to assess the effect of the enemy variable on each of your own lines of action. This method has the advantage of eliminating from extensive consideration courses of action which a later examination of the constants proves to be impracticable.

(2) By an initial statement of the courses of action open to both sides (the variables), followed by a consideration of the effect of the constants on these courses of action. Since the commander is familiar with his situation at all times he is able to do this. However, the disadvantage is that many of these lines of action he may list initially prove to be impracticable when weighed together with all the factors of the situation. As each is considered it must be considered in connection with all the constants as well as in opposition to each of the hostile lines of action. This results, in tactical situations, in extremely voluminous estimates. However, in certain types of estimation, such as of supply situations, where the courses open are extremely limited by the nature of the problem, this method has advantages over the first method.

(3) Relative combat power is determined initially with the underlying idea of getting the answer to the question of what

type of tactical operation, offensive or defensive, for example, should be adopted. Following this the courses of action open are stated. These are then analyzed against the constants and your own lines of action against the courses open to the enemy. This basically is not reasonable, because the mission is the determining factor in this decision. This also results in an extremely voluminous estimate, and is open to question due to the excessive importance placed on the single factor of relative combat strength. Relative combat strength, or combat power, is the sum of so many factors of the situation that it cannot be determined as an isolated factor. Terrain, dispositions, roads, supplies and many other matters besides those usually considered, such as strength, composition, leadership and morale, influence relative combat power. If a genuine attempt is made to assess relative combat power it will be found that the entire situation must be considered to arrive at a just conclusion.

The first method is that used in the Commander's Estimate of the Situation at The Command and General Staff School. The second method is that used in the G-4 Estimate of the Situation at The Command and General Staff School. The third method is the one given in the *Staff Officers' Field Manual*, 1930, except that instead of opposing to each of your own lines of action all of the enemy capabilities, the enemy's probable intentions are deduced and only this one enemy capability is considered in connection with your choice of a line of action. The question of enemy capabilities versus intentions will be discussed more in detail later.

The Sequence of Reasoning Followed in the Commander's Estimate of the Situation as Used at The Command and General Staff School

The procedure followed in the commander's estimate of the situation is essentially a process of elimination of unsuitable tactical methods in successive steps. (See Figure No. 1) This results in a constant narrowing down of the range of choice, first to reasonable and practicable lines of action and, finally, to the single line of action adopted. Coincidentally, the advantages and disadvantages of each of these lines of action are determined.

FIGURE No. 1

THE LOGICAL BASIS OF
THE COMMANDER'S ESTIMATE OF THE SITUATION

Par. 1 **OBJECT**	With the **MISSION** as the guiding consideration
Par. 2 **CALCULATION**	Estimation and Calculation of the **CONSTANT FACTORS** of the situation (Relative Combat Power, Time and Space, Terrain, etc.) in combination with all appropriate methods of **TACTICAL ACTION** leads to **DEDUCTION of their EFFECT** (preventing, hindering, favoring) to **LIMIT the ACTION of the** **VARIABLE FACTORS** **YOUR FORCE** — To all reasonable and practicable lines of action open to you to accomplish your mission. (1, 2, etc.) **ENEMY FORCE** — To all physical capabilities of the enemy to hinder the accomplishment of your mission. (1, 2, 3, etc.)
Par. 3 **VISUALIZATION**	**ANALYSIS** of the lines of action and capabilities of the **VARIABLES** **(WHAT WILL HAPPEN IF)** **OWN LINES OF ACTION** **OPPOSED BY** **ENEMY CAPABILITIES** etc. Leads to determination of the **ADVANTAGES &** **DISADVANTAGES** of your own lines of action.
Par. 4 **SELECTION**	**COMPARISON** of the advantages and disadvantages of your **OWN LINES OF ACTION** leads to
Par. 5 **DECISION**	**DECISION**

The first step is to gain a clear comprehension of the mission. Any tactical methods which are not in accord with it are discarded from further mental consideration.

The second step consists of a methodical evaluation of the effect of the constant, or passive, factors of the situation upon:

(1) Your choice of a line of action.

(2) The physical capabilities of the enemy to act to interfere with its accomplishment.

By constant, or passive, factors are meant those factors such as relative strength, terrain, dispositions. They are arbitrary constants at the instant the estimate is being made. The variable factors in the situation are your force and the enemy. Evaluation of the effect of the constants determines the limits of action of the variables. It also serves to determine the advantages and disadvantages, in connection with the constants, or your own lines of action. This step concludes with a statement of:

(1) The courses of action, within the physical capabilities of the enemy, which can interfere with the accomplishment of your mission. They are called enemy capabilities.

(2) The reasonable and practicable lines of action open to you to accomplish your mission. They are called your own lines of action.

The third step consists of determining the further limitations imposed on your choice of a line of action by the capabilities of the enemy to act to interfere. At the same time, the advantages and disadvantages of these lines of action, with especial reference to enemy capabilities, are determined. This is done by a visualization of what would happen, in all the contingencies resulting, if each of your own lines of action were opposed by each of the enemy capabilities. At the completion of this step, every advantage and disadvantage of your own lines of action should have been explored and every contingency that could happen if any one of them were adopted should have been visualized.

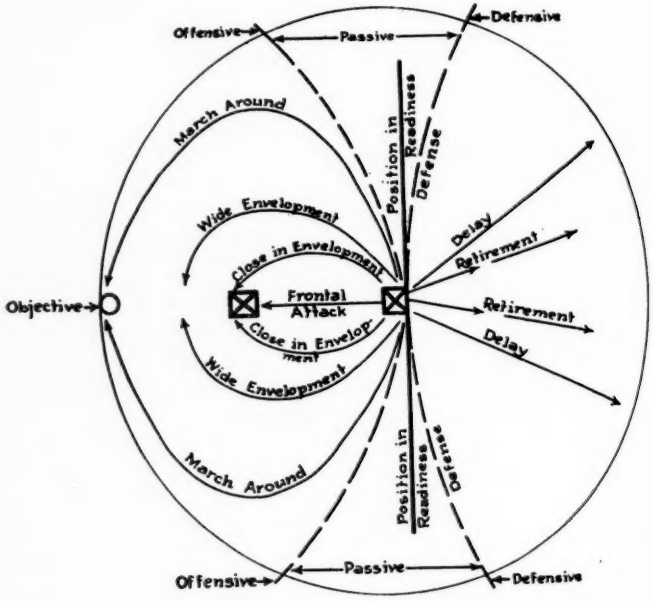
The fourth step consists of summarizing the most important advantages and disadvantages of each of your lines of action, which favor or inhibit its adoption, and of making a choice of the line of action to be followed.

The fifth step consists of making a precise statement of the basic elements of the line of action selected.

The apparently involved process can be illustrated schematically. Figure No. 2 shows a schematic situation. The Blue

FIGURE NO. 2

Schematic situation before consideration of the mission, showing all lines of action by which Blue can act. The circle represents the envelope containing the loci of the variable: Blue.

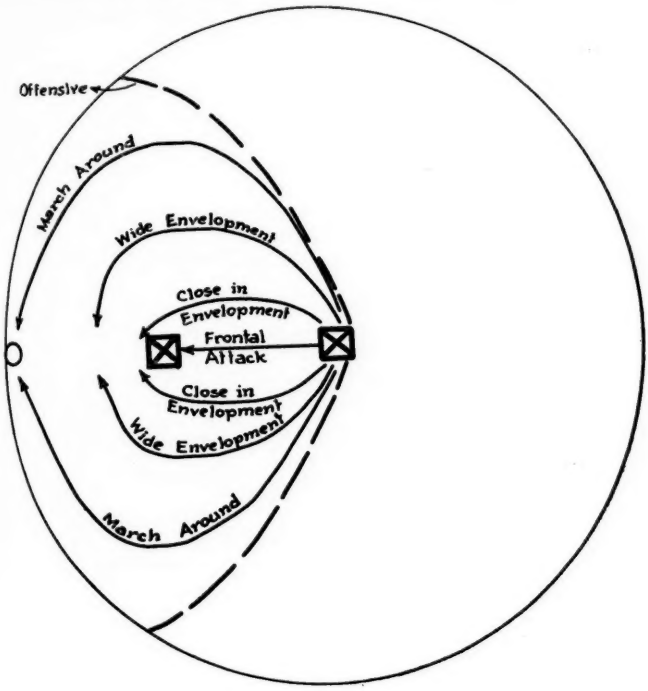


force has as objective the capture of the point "O." A Red force is between Blue and the objective. All the common types of tactical operation of small forces are shown schematically with reference to Blue. Since the Blue mission is offensive, the Blue commander will automatically discard from further consideration all tactical methods which are not offensive in character as they would not fulfill the mission. This will leave

a schematic diagram of lines of action open to Blue as indicated in Figure No. 3.

FIGURE No. 3

The effect of consideration of an offensive mission and superior combat power. All passive and defensive lines of action are eliminated from further consideration by Blue.



In Figure No. 4 the effect of the time and space factors are shown. Time will permit either a frontal attack or a close-in envelopment that day but will not allow a wide envelopment or march around to be completed until the following day. That leaves the commander with the option, at this point in his estimate, of attacking today by means of a frontal attack or close-in envelopment or attacking tomorrow making a wide envelopment.

FIGURE NO. 4

Schematic representation of time and space computations.

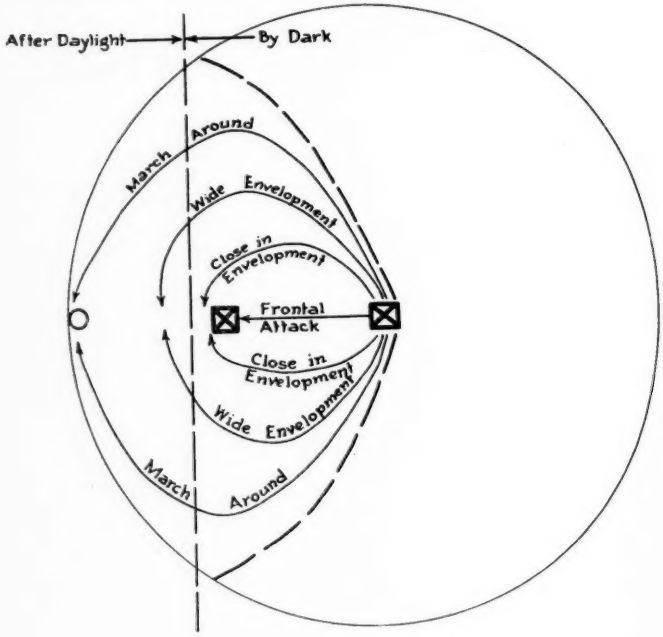
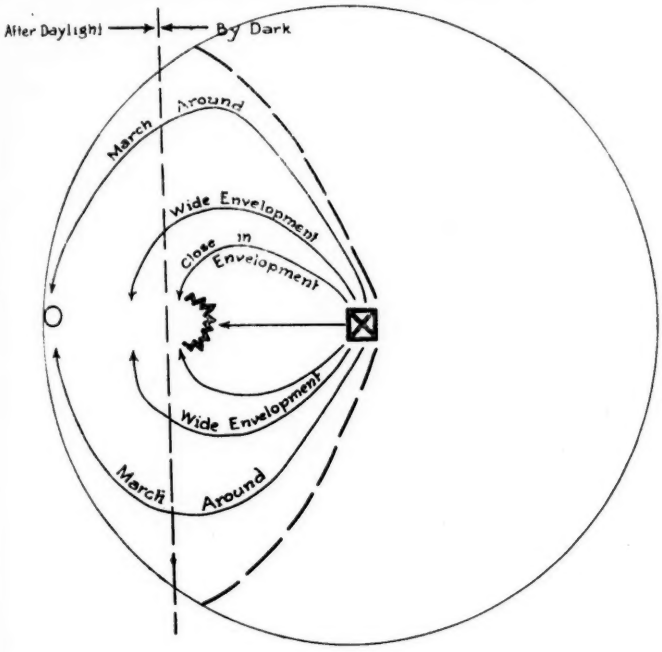


FIGURE NO. 5

Dispositions: Red is shown as entrenched in a prepared position.

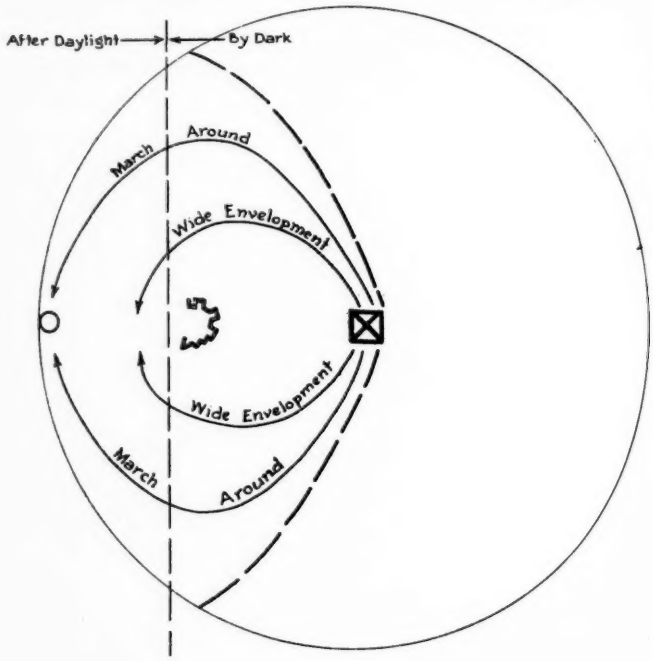


In Figure No. 5 the Red force is pictured as entrenched, this being considered in the estimate under the heading of dispositions. The Blue commander knows that the attack of an entrenched position offers little chance of success unless he has a massive superiority of artillery and tanks and he will not attempt it if he can turn the position and avoid the Red organization. "The protective power of modern weapons is so great that where these are strongly and deliberately organized for defense they practically assure invulnerability." (Report of

Chief of Staff, 1935) The effect of the Red entrenched position is to cause him to eliminate from further consideration a frontal attack or close-in envelopment of either flank, thus narrowing his choice of a line of action to those shown in Figure No. 6.

FIGURE NO. 6

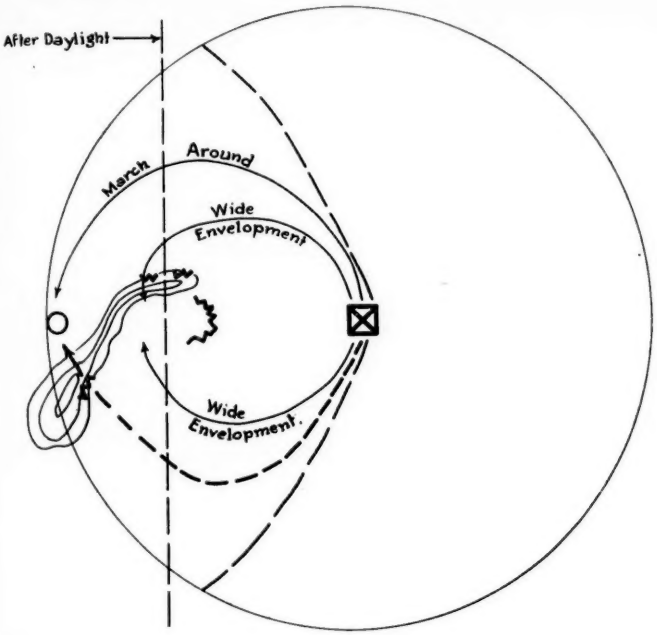
Effect of Red dispositions on the choice of a line of action by Blue.



In Figure No. 7 a terrain feature is inserted. Since the march around the south flank will lead directly into a defile now held by Red the terrain leads the Blue commander to discard any further consideration of a march around the south flank. The Blue commander has assessed the effect of the constants on his situation and by an examination of them he has eliminated all but three of the possible offensive lines of action with which he originally was presumed to be able to act. He has left open for selection a march around the north flank, a wide envelopment of the north flank, and a wide envelopment of the south flank.

FIGURE NO. 7

Effect of terrain.



Can he eliminate any of these by the constants of the situation? Probably not. Which of them is most suitable will depend primarily upon what action the enemy will adopt.

The procedure so far covered is that which is covered, with reference to your own force, in paragraph 2 of the estimate of the situation outline in use at The Command and General Staff School. But it has only considered the effect of the constants on the Blue lines of action. In making an estimate the effect of these constants is applied to both Blue and Red at the same time. In the schematic situation they do not prevent Red from adopting any line of action. His capabilities then are to adopt any type of offensive or defensive action he may desire. He could attack the Blue enveloping force, the Blue holding force, he can defend his present position, delay in successive positions, or retire.

The next step in the estimate is to assess the effect of each of these Red capabilities on each of the lines of action open to

Blue. If it is assumed that Blue has superiority of two to one over Red in relative combat power, then any attack by Red will play into the hands of Blue. The Blue holding force will be large enough to resist successfully an attack by Red and the enveloping force would reach Red's rear without difficulty. The detachment, by Red, of a large portion of his force to delay or resist the enveloping force would permit a successful attack by the Blue holding force and result in a meeting engagement with the enveloping force, in which the superior force would have a great advantage. The deduction can be made that the Red capability of attacking does not affect the choice of a line of action by Blue, but should be considered as a possibility so that such an attack could not come as a surprise and catch Blue at a disadvantage.

FIGURE NO. 8

Analysis of a wide envelopment of the south flank opposed to principal Red capabilities.

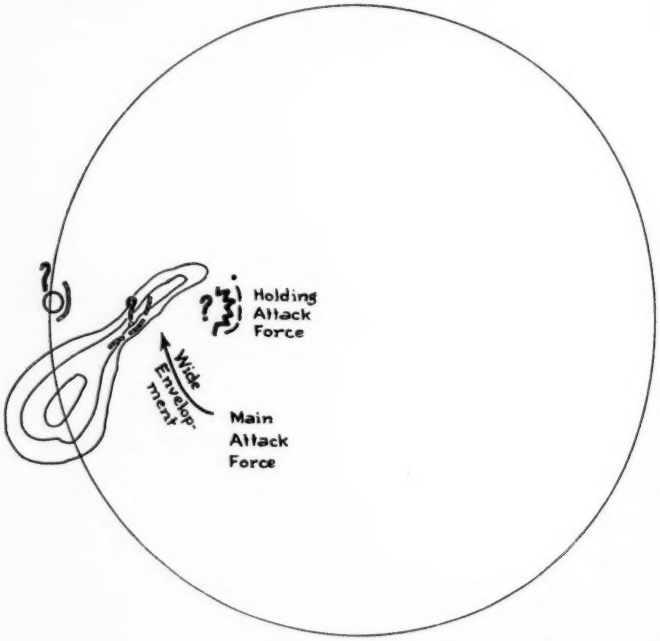


Figure No. 8 shows schematically the effect of the different Red defensive capabilities on a Blue wide envelopment of the

south flank. If Red defends the envelopment should be successful. If Red delays in successive positions or withdraws to the high ground in the rear of his position Blue will be forced to attack a strong position. If Red withdraws to the objective Blue will have to reorganize his attack and will have to approach the objective over difficult terrain on which he can be delayed easily. The conclusion reached by the Blue commander is that this line of action will be suitable only if Red remains and defends his present position.

FIGURE NO. 9

Analysis of a wide envelopment of the north flank opposed to principal Red capabilities.

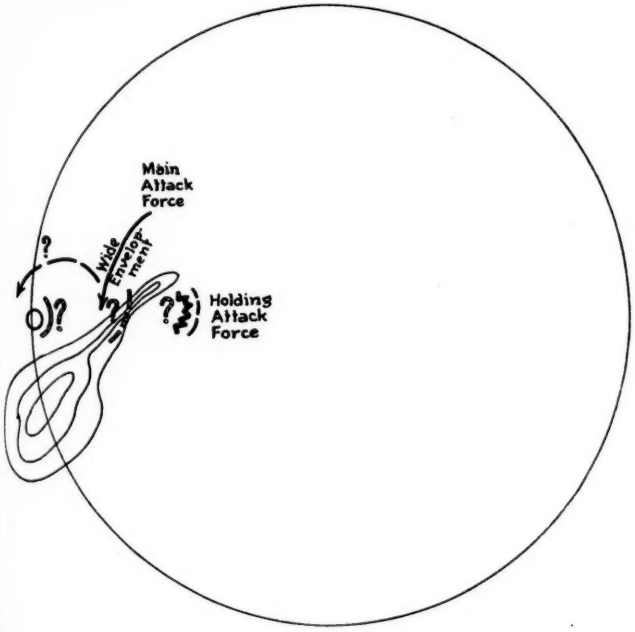
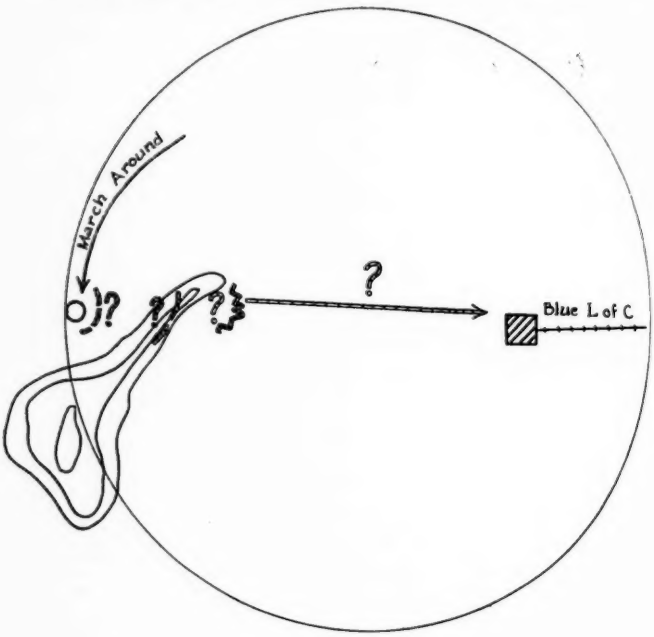


Figure No. 9 shows a similar schematic analysis of the effect of Red capabilities on a Blue wide envelopment of the north flank. The attack should be successful if Red defends in his present position or delays, withdrawing to an initial position. If Red were to withdraw to the objective, Blue is in a favorable situation as regards terrain and time to continue his maneuver to the west and envelop the objective. Regardless of the action

of Red a wide envelopment of the north flank offers good prospects of prompt success.

FIGURE NO. 10

Analysis of a march around opposed to the principal Red capabilities.



In Figure No. 10 the Red capabilities with reference to a Blue march around are visualized. If Red defends, withdraws to an initial delaying position or to the objective, the march around offers excellent prospects of success. However, if Red were to move on Blue lines of communication the results might be very serious and force Blue to give up his objective and make the Red force the objective.

The analysis indicates that a wide envelopment of the north flank by Blue offers good prospects of success regardless of what action Red follows. A wide envelopment of the south flank would succeed promptly only in case Blue defended, while a march around exposes the Blue lines of communication to Red and might force Blue to abandon his mission temporarily and seek out and defeat Red. The decision to make a wide envelopment of the north flank is obvious.

Estimate of the Situation, SOFM, 1930

Most officers are familiar with the estimating method given in the *Staff Officers' Field Manual*, 1930. A brief discussion of the method and of objections to it follows. The form comprises the following principal headings:

1. Mission.
2. Opposing forces.
   - *a*. Enemy forces.
   - *b*. Own forces.
   - *c*. Relative combat strength.
3. Enemy situation.
   - *a*. Plans open to the enemy.
   - *b*. Analyses of the enemy's plans.
   - *c*. Enemy's probable intentions.
4. Own situation.
   - *a*. Plans open to you.
   - *b*. Analyses of plans open to you.
5. Decision.

In paragraph 2 the combat strength of the opposing forces is considered in great detail. From this consideration is deduced a conclusion as to the relative combat strength. This deduction is intended to be used by the commander in arriving at his determination as to whether or not the relative combat strength of his force is such as to permit him to undertake offensive action or require him to adopt a defensive or other course. It is supposed to solve the basic part of his decision, *what* he will do. The difficulty with the theory is that it does not work out in practice. Combat power is dependent on so many factors of the situation that to obtain a just estimate of the relative combat strength all the other factors of the situation have to be considered. Thus, in one case the power of his force may be doubled by the favorable terrain he occupies. In another case it may be limited by lack of ammunition. And in every case the relative combat strength will vary with the type of operation adopted. It has proved, in practice, to be impossible to separate the problem of the basic decision from the method of combat to be used. There is a further objection in that the mission should be the governing factor in this part of the decision. Actually, relative combat strength is only one of the many factors that have to be weighed and considered to reach a deci-

sion. There is no real benefit gained from isolating it from all the other factors of the situation. There is considerable real harm, as this type of estimate has been used in practice, in that it loads the estimate down with a mass of unimportant detail.

In paragraph 3 the *Staff Officers' Field Manual* states: "In the subparagraphs under this heading should appear a full consideration of the enemy's probable mission and plans open to the enemy . . . A deduction of his probable intentions also is made for use in the consideration of plans open to you." In other words the commander makes a decision for the enemy. The objection to this is that the enemy will usually disappoint him. The enemy, from his opponent's point of view, frequently does the most absurd things. An alert enemy will do his best to deceive his opponent as to his intentions, and the intentions you are led to believe to be his will not be. History is full of examples of battles lost because of inaccurate guesses of the enemy's intentions. The answer is not to guess them more accurately, but not to attempt to guess them at all and to be prepared to meet any action of which the enemy is physically capable. The same objection applies to deductions of the enemy's most dangerous action or most reasonable action as judged from his situation. Any time the commander fixes his mind on just one most probable, most reasonable or most dangerous action the enemy can adopt, he is closing his mind to all the other capabilities of the enemy and is inviting disaster if the enemy does not oblige him.

In paragraph 4 "should appear a full consideration of the plans considered as open to you in view of your mission, the existing tactical situation, and of your strength and dispositions as compared with those of the enemy." The method pursued is to select the plans first and then to test the practicability of each by the factors of the situation, such as time and space, terrain, weather, routes of communication, etc. The fundamental objection to this method of approach is that *each* plan must be considered separately against *all* the factors in the situation. This results in a great deal of repetition in the estimate and its effects can be seen in estimates of simple situations formerly put out as solutions at The Command and General Staff School which filled ten closely printed pages. Another objection is that impracticable plans are set up because they are set up prior to careful consideration of the situation. In effect a large number of straw men, in the form of plans of action, are set up and then

knocked over by subsequent consideration of the situation, placing a burden of verbiage in the estimate. The opposite procedure, now used, of determining the limits on the plans open to your own forces by careful consideration of the effect of the factors of the situation, serves to limit the plans finally considered to the one, two or three which are actually practicable.

It should be noted especially that the enemy's probable intentions are the only enemy plan used, in this form, by which the feasibility of your own plans are judged. This should be compared to the careful analysis made by Napoleon of five possible lines of action open to the enemy in the example previously quoted. Napoleon did not attempt to deduce the enemy's intentions. He considered every action the enemy was physically capable of following and prepared alternative plans, in connection with the plan he was then following, to meet any action the enemy might undertake. He kept an open mind.

Capabilities Versus Intentions

The disasters that can follow fixation on the presumed intentions of the enemy can be illustrated with an example from the Battle of Chancellorsville. The situation of the Union and Confederate armies prior to the battle was as shown on Map No. 1. Burnside had attacked Lee at Fredericksburg in December and had been disastrously defeated. Major General Joseph Hooker, described by Senator Sumner as a "blasphemous wretch" had stirred up dissension in the army against Burnside after the battle and had boasted with great skill of how much better he could do if he were given a chance. Hooker was placed in command. He had planned an attack, but had kept his plans secret with great care. General Lee expected an attack and depended upon his spies to furnish him with information about where it would take place. On 12 March, after receiving reports from his spies, Lee wrote to Stuart: "The enemy will, as soon as the roads permit, cross at the United States Ford, Falmouth, and some point below, the attempt at Falmouth to be a feint." On 16 April, he wrote to President Davis: "My own impression has been that the movement (of the Federal Cavalry) was intended to draw us to the upper Rappahannock, that Fredericksburg might be seized, and the bridges across the river rebuilt." And on 17 April to Stuart:

"His movement on the upper Rappahannock may have been designed to draw us out from our present position."

On 23 April the Union forces made a feint at Port Royal. Lee wrote to Jackson, who had been deceived by the feint and wanted to move his corps to meet it: "I think his present purpose is to draw our troops in that direction (Port Royal), while he attempts a passage elsewhere. . . . I think that if a real attempt is made to cross the river it will be above Fredericksburg." By the words "above Fredericksburg" Lee referred to the section of the river between Falmouth and the United States Ford.

On 28 April Hooker's XI Corps, commanded by General Howard, crossed at Kelly's Ford, well on the way to Lee's rear. On 29 April, when Lee learned of it, he was still so fixed in his belief in the *intentions* he had ascribed to Hooker that he telegraphed the Adjutant General at Richmond: "If any troops can be sent by rail to Gordonsville, I recommend it. Longstreet's divisions had better come to me, and the troops for Gordonsville from Richmond and North Carolina. General Howard of the enemy's forces making toward Gordonsville." Every indication pointed to the fact that Hooker was making a wide envelopment of Lee's north flank, but he had so assured himself that Hooker's intentions were otherwise that he refused to divest himself of his preconceptions even after the largest Union Corps was well on its way to his rear.

The situation on 30 April is shown on Map No. 2. Not until this time was Lee able to accept the idea that the enemy attack was to be on his rear. Then he wrote: "The enemy in our front near Fredericksburg continued inactive and it was now apparent that the main attack would be made on our flank and rear." But by this time his situation was desperate. He had clung to his fixed belief in Hooker's intentions too long to frustrate the movement which placed the greater part of Hooker's force on his rear and bottled him up against the Rappahannock River.

At this stage of the battle it is of interest to change sides and look at the situation from the point of view of General Hooker. He had prepared with great secrecy and executed a difficult maneuver to get on the rear of his great opponent. His entire force was approximately double that of General Lee. He would shortly have more men on Lee's rear than Lee had in his entire army. He needed only to attack with all his forces and

Lee's defeat was assured. But during the Civil War entrenchments were valued as they are now. "The XI Corps, which was the largest, and held the post of honor upon the right of the army, was stationed behind strong earthworks, which, according to the military treatises rendered *one soldier who defends equal to at least three that attack.*" (Captain Blake, *Three Years in the Army*, 1865) General Hooker thought that he could force Lee to attack him in a prepared position, so instead of attacking without delay he had his force entrench and await attack. He deduced General Lee's intentions and published his views in a General Order to his army as follows: "Our enemy must either ingloriously fly or come out from behind their intrenchments and give us battle on our own ground where certain destruction awaits him." Lee detached Jackson's corps to move around the Union south flank and attack Hooker in the rear. The Union forces heard them chopping their way through the woods. Hooker had so convinced himself of Lee's intentions that it never occurred to him that Jackson, instead of ingloriously flying, was maneuvering against Hooker's rear just as Hooker had maneuvered against Lee's rear.

Map No. 3 shows the situation on 2 May. Jackson's attack on Hooker's rear completely demoralized the XI Corps and General Hooker and the Union forces left the field defeated in a battle in which few more than a half of their men had been in action.

Many attempts were made to explain the failure of Hooker in this battle. His enemies claimed that he was drunk during the battle. His friends said, that on the contrary, he had not taken a drink during the battle and the unaccustomed abstinence was the cause of his indecision after his initial success. Hooker told a friend who asked him later that the trouble was that he "lost confidence in Hooker." The latter, together with his belief in Lee's intentions, probably accounts for his actions.

It is of interest to turn from these failures in guessing the opponents' intentions to General Halleck. General Halleck, though the General in Chief, was not allowed to command. President Lincoln said of him on 4 November 1862: "He was a moral coward, worth but little except as a critic and director of operations." The Secretary of the Navy, Gideon Welles, expressed his opinion of him as follows: "He had suggested nothing, decided nothing, done nothing, but scold and smoke and scratch his elbows." Admiral Foote called him a military

imbecile. He was the author of the best known American military text on strategy and tactics of the time. Actually he performed his arduous duties with integrity and Lincoln retained him as his principal military adviser throughout the Civil War.

Shortly after the Battle of Chancellorsville he wrote his estimate of the situation to the Secretary of War as follows:

> ". . . The Army of the Potomac may for some time remain inactive.
>
> "It is proper to consider the consequences of this inactivity. In that case, Lee's army will have three plans from which to choose.
>
> "1. To cross the Rappahannock, attack Hooker's army, and risk the result of a general battle. Lee is as prudent as able, and I do not think he will run the risk.
>
> "2. To make a demonstration on Washington, Maryland, or Harper's Ferry, and seek to regain possession of Norfolk. This is by no means improbable.
>
> "3. To make a feint upon Norfolk, and a real movement in force on Washington, Maryland or Harper's Ferry. Such an operation, with an active army and an energetic commander, in the position now occupied by the Army of the Potomac, would be exceedingly hazardous. Nevertheless, it may be attempted, as Lee's army can move with greater rapidity than ours.
>
> "It is also very probable that Lee will maneuver so as to leave us in doubt what his real intentions are. While he makes demonstrations in both directions, we shall probably know his real intentions only after the blow is actually struck."

The third contingency considered by General Halleck was the one Lee adopted, and led to the battle of Gettysburg. The low state in which Halleck's opinion was held at that time prevented serious consideration being given to his estimate. The Union army was surprised by Lee's movement and was only able to follow Lee into Pennsylvania, several days' march behind him.

Estimation As a Continuous Process

In exercises and school problems where the student is given a complete situation at the exact time when a decision must be

made, the tendency grows to look upon estimation of his situation as a certain magical interlude wherein the commander takes time out and makes an estimate. In war estimation of his situation is a continuous process for the commander. With each change in the situation, he must revise his estimate and decide either to continue the line of action upon which he is proceeding, or to announce the new decision if a change is required. The commander will not be able to make a tactical decision containing all the elements of his plan in the early estimates. His initial decision, for example, may have been to march toward a certain objective. As information of the enemy is accumulated he may be able to decide only that he will attack. When and where the attack will take place, and the tactical method of attack, will have to be determined as the situation develops. As he nears contact with the enemy, he may be able to decide and announce that he will envelop one or the other flank. The place, time and objective of the attack may still be dependent upon enemy action or upon information. Decision as to the other elements of his plan may have to await fixing the enemy. A supplementary decision at this time may concern the action of the covering forces and the information agencies. On the other hand, he cannot wait for information to make a complete or partial decision when the need for action is urgent. He may have to make his complete decision and issue orders in compliance with his mission, regardless of scanty information or a rapidly changing situation.

The Influence of the Various Factors in the Tactical Equation

The order issued by the superior is the mission of the subordinate. Missions will vary in amount of detailed prescriptions, clarity and freedom of action allowed the subordinate, depending upon the situation and the confidence the commander reposes in his subordinate. It thus frequently occurs that a trusted subordinate is given an order which tells him only the result to be accomplished. When Grant finally gave Sheridan the mission of driving Early out of the Shenandoah Valley his sole orders to Sheridan were: "Move out and whip Early." At one time when this order was being discussed with Grant, an officer present ventured the remark: "I presume the actual form of the order was to move out and attack him."

"No," answered Grant, "I mean just what I say; I gave the order to whip him." General Lee gave detailed or general missions to subordinates in accordance with the character and trust of which they were worthy; to Jackson a mere indication of what was to be accomplished, to others exact and detailed instructions. The diversity of character of missions assigned is recognized in *Combat Orders*, C. & G.S.S., which distinguishes between a *mission* type of field order and a *detailed* field order.

Before arriving at a decision it is necessary that the commander should gain a clear idea of just what his mission requires him to do. For this reason it is not usually advisable merely to repeat the mission given at the outset of an estimate. The mission requires analysis to determine the order of priority of the actions it may require and to gain a clear comprehension of circumstances within which it is to be accomplished. A division, for example, may be given an order to protect a bridgehead for the crossing of other troops to follow. This mission will require him to hold the enemy beyond artillery range of the bridge for the time needed for the other troops to cross. If the force to cross were large it might require holding a still larger area so that they would have space in which to deploy out of artillery range after crossing. If the time the bridge was to be protected was long and the prospective opposition strong, it might be necessary to move considerably in advance of the bridge and to gain time by delaying action. Such an analysis would be necessary before the commander would proceed with his detailed estimate of terrain, time and space, etc.

Great importance is placed on adherence to the mission. To give it up risks wrecking the plans of the superior. In all modern armies, except the German, a commander is not permitted to give up his mission as long as the commander who gave it can be reached in time to be informed of the changed circumstances. German practice permits a commander to change his mission in accordance with the changed situation, but requires him immediately to inform his superior of the change he has made. Although the Germans have at times suffered from this practice they believe that the benefits of independence and initiative it allows to subordinates more than compensate for the occasional disasters resulting from poor judgment.

Turenne, replying to instructions from the King chiding him for exceeding his orders on one occasion, wrote: "I think

Your Majesty will do me the honor to believe that I shall never disobey you except when, being at a distance, I feel sure that you would take it ill of me and that it would be altogether injurious to your service to do things that you would not order me to do if you were on the spot, and I understand full well that Your Majesty might be angry, and that even success would not justify me, but in that case I shall rely only on Your Majesty's goodness." Turenne's dilemma is one that every commander may be called upon to face. His statement of the occasion when he would act without instructions is almost identical with the prescriptions now in force at The Command and General Staff School governing such a situation.

Every commander has the underlying mission of saving his command from annihilation unless he has been ordered to carry through the operation ordered regardless of cost. To give up his mission is the most difficult of all decisions and one for which the commander will in most cases, be censored. Likewise, a rigid adherence to a limited mission which foregoes opportunities may result from undue emphasis being placed on the fulfillment of the exact letter of the mission. German practice has many advantages and is well worth consideration in the American service.

Relative combat power, in problems in school, is usually deduced from consideration of strength and composition of the forces. An attempt, in problems to indicate morale, state of training, battle experience, leadership and the many other factors that affect relative combat power in war is usually misleading. But, in war, these very factors are the predominating ones in such a determination. "He who reckons solely by the tangible in war is reckoning falsely," wrote Hindenburg. "The inherent worth of the soldier is everything. It was on that that I based my confidence. What I thought to myself was this: The Russian may invade our Fatherland, and contact with the soil of Germany may lift up his heart, but that does not make him a German soldier, and those who lead him are not German officers. . . . On the other hand, I considered, that, taking it all around, the Russian soldier and officer would not display higher military qualities in the European theater than they had in the Asiatic, and believed that in comparing the two forces I was entitled to credit our side with a plus on the ground of intrinsic value instead of a minus for our numerical inferiority. Such was our plan and such our estimate of the situation before and for the battle."

But another time proceeding on the same basis he reckoned falsely. "The action of Main Headquarters was explained on the one hand by their confidence in the offensive capacity of the Bulgarian Army and on the other by a certain underestimate of the enemy's strength at Salonica. In particular we were absolutely deceived about the *value* of the newly formed Serbian units, six infantry divisions, which had made their appearance there." How little attention he paid to mere numerical strength and how much to inherent worth. In war it will always be the same. Numerical preponderance can never make up for green troops and untrained leaders and staffs.

Reinforcements, either for the enemy or for your own troops are often paramount in the decision. In the past, the time and space factors which limited their participation could be calculated easily since they could only move forward by marching. In the future, motor transport will make reinforcement the great incalculable in battle. Any attack may find itself met by a counteroffensive as a result of hastily moved in reinforcements.

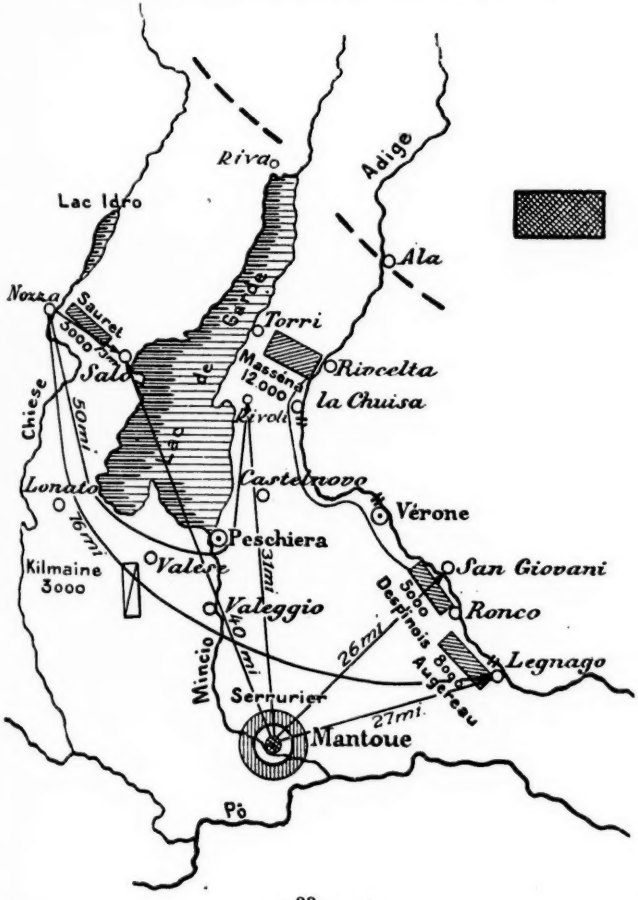
In making plans for the St. Mihiel attack the German ability to reinforce the front exercised a decisive influence on the estimate. Among the matters considered was the length of the preliminary bombardment. It was desired to have as much of a preparation as possible, both for the effect it would have on the enemy works, wire and personnel, and the moral effect on our own troops. However, secrecy was desired and, of course, a very lengthy bombardment would inevitably give warning of the attack. Past attacks of this nature had often been preceded by days of fierce artillery preparation. A careful study of this problem showed that in 22 hours the enemy could bring up from his reserve three full divisions and have them ready to be thrown into the line. It also showed that in four hours he could not get up one whole division. A four-hour bombardment was decided upon.

"War," wrote Marshal Marmont, the general to whom Napoleon most frequently turned for consultation, "in actuality, reduces itself always to a calculation of time and distance." "Napoleon," one of his staff officers wrote, "was always occupied with geographical calculations. With an experienced glance, he figured with surprising facility the length of miles and time on which depended the combination of the marches of his armies in accordance with his strategical or tactical plan."

The campaign of Castiglione is a brilliant example of dispositions carefully made from minute calculations of time and space. As a result of the brilliant successes at the beginning of the campaign of 1796, peace had been imposed on the King of Sardinia and the Austrian Army had almost disappeared from the theater of operations. The French forces, bivouacked on both banks of the Mincio, covered the siege of Mantoua; they observed the Tyrol and Frioul where the enemy reconstituted his army. (See Map No. 4)

MAP NO. 4

Napoleon's dispositions for the Campaign of Castiglione



Bonaparte was totally uninformed of the Austrian intentions.* He was forced to choose a strategic position which would permit him to bring sufficient forces wherever the Austrians might take the offensive, and the choice of this strategic position was dictated by time and space calculations. This is proved by the dispatch sent by Bonaparte to the Directory to render account of the measures taken:

"General Sauret (3,000 men) defends from Salo to Lake Idro.

"General Massena (12,000 men) defends from Torri to Rivalta on the Adige and from there he defends the passage of the Adige as far as San Giovanni, three thousand meters below Verona.

"Verona has been placed in a state of defense.

"General Despinois (with 5,000 men) defends from San Giovanni as far as Ronco.

"Augereau (with 8,000 men) defends from Ronco to Castagnaro; there are some flood gates by which he is able to inundate all the low country.

"General Kilmaine (with 2,000 cavalry and two battalions) at Valese where he is able to move wherever the enemy may attempt a passage.

"Three bridges: Verona, Legnago and the bridge of boats near Chiusa.

"By means of these three passages the army can pass rapidly, at the first forward movement of the enemy, from the defensive to the offensive.

"The enemy has his advance posts at Ala, at Malcesine, and he is now moving fairly large columns behind the Brenta; he has nearly 8,000 men at Bassano.

"We have been several days in observation in this position. *Disaster will be the lot of the one who calculates badly.*"

Bonaparte had very certainly combined the locations of his different corps according to the time necessary for their concentration.

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*The greater portion of military historians note that the Austrian General Wurmser having divided his forces, the central position of Bonaparte between the two Austrian columns answered perfectly to the situation. Without doubt. But he forgot to say that Napoleon knew absolutely nothing of the intentions of his adversary. Thus his dispositions were not a consequence of the Austrian plan of operations, but solely the result of his foresight and of his strategic calculations.

Mantoua is 40 miles from Salo;
31 miles from Rivoli;
26 miles from San Giovanni;
27 miles from Legnago.

If the attack of the Austrians were to be made on any one of these points the corps that it encountered would, by its initial resistance, give time for the others to unite towards Mantoua.

The distance to be covered amounted to:

from Salo to Mantoua	16 hours 30 minutes
from Rivoli to Mantoua	12 hours 45 minutes
from San Giovanni to Mantoua	10 hours 30 minutes
from Legnago to Mantoua	11 hours 30 minutes

The most unfavorable eventuality would be that where an enemy corps marching on Mantoua attempted to reach there by the shortest route, that is to say, by San Giovanni. If a decision was made to concentrate in the vicinity of Mantoua, before the arrival of the corps marching to assistance, it would be sufficient for General Despinois, stationed near San Giovanni, to retard the march of the enemy to permit:

(1) To inform general headquarters at Castelnovo (24 miles distant) of the situation, say	2 hours
(2) To carry to the most distant division (General Sauret at Salo) the concentration order	2 hours 10 minutes
(3) To march Sauret's division to Mantoua	16 hours 30 minutes
Total	20 hours 40 minutes
And since the Austrians themselves needed (to march from San Giovanni to Mantoua) some	10 hours 30 minutes
The difference	10 hours 10 minutes

represents the time which General Despinois (aided if necessary by General Augereau and the cavalry of General Kilmaine) was required to retard the march of the enemy. The three French divisions united amounted to about 16,000 men; they were protected by an obstacle difficult to cross. The result to be expected does not seem exaggerated.

If Sauret's division were kept at Salo, since it had but a strength of 3,000, and only the three others were concentrated, the problem became very easy.

(1) Notify general headquarters as before	2 hours
(2) Send orders to Massena's division in	2 hours 50 minutes
(3) This division marches	12 hours 45 minutes
Total	15 hours 35 minutes
The duration of resistance imposed on General Despinois was reduced to	5 hours 35 minutes.

If the offensive came through Legnago, it would suffice that General Augereau (aided as necessary by the divisions of Despinois and Kilmaine) resisted 10 hours and 40 minutes to permit the divisions of Massena and Sauret to reach Mantoua, or only 5 hours and 35 minutes if only Massena were called. Thus, in case of an offensive by the enemy by Legnago, the duration of the resistance necessary was augmented slightly, but always to a realizable extent, and the general situation of the adversary was not ameliorated, his right flank being more exposed.

If the attack came by Rivoli, Massena with his 12,000 men and the 3,000 cavalry of Kilmaine, had to delay the enemy for 6 hours and 45 minutes if all the divisions were brought to Mantoua, or for 2 hours if Sauret's division was excepted.

Events could require a concentration towards Castelnovo or towards Valeggio. The different hypotheses possible on the direction of the attack simply required analogous calculations.

In these diverse conjunctures the line of retreat was not compromised. If the enemy attacked the divisions of Augereau and Despinois, he threw them back on the line of communication. The same for Massena if the Austrians came by way of Rivoli; as for the line of communication of Augereau's and Despinois' divisions, it is found to be, at Mantoua, beyond the enemy's reach, since the Austrians were 31 miles from there while Augereau's division, the most distant, had to march but 27 miles to return to Mantoua.

To summarize, if an attack was made at either the higher or lower reaches of the Adige, the necessary time and space for maneuver were available.

"It is to be ignorant and blind," wrote Polybius, the Grecian biographer of Hannibal, "in the science of commanding armies, to think that a general has anything more important to do than to apply himself to learning the inclinations and character of his adversary," and to Hannibal's observance of this maxim he ascribes the extraordinary victories of the great Carthaginian. Napoleon, when his luggage was captured during the retreat from Moscow, was found to carry with him biographies of all the Russian generals opposed to him.

His military secretary wrote of Lee: "He studied his adversary, knew his peculiarities, and adapted himself to them. His own methods no one could foresee; he varied them with every change in the commanders opposed to him. He had one

method with McClellan, another with Pope, another with Hooker, and yet another with Grant. But for a knowledge of his own resources, of the field and of the adversary, some of his movements might have been rash. As it was they were widely bold." When that bluff Confederate, Whiting, wrote to Beauregard, "Hooker is a fool, and always was, and that's a comfort," the exaggerated estimate deserves notice chiefly because it is certain, with others similar, to have made its way to Lee and to have been his best excuse for Jackson's apparently foolhardy movement at Chancellorsville.

"Terrain," states the French *Regulations for the Tactical Employment of Large Units*, "exercises a tyrannical influence on every maneuver." This is true to an extent greater than ever before. Modern ground weapons and transportation must be allied with the terrain or they may be useless. Terrain is the great constant in military operations. Aerial photography permits exact knowledge of the ground to be marched or fought over. The great commanders of the past have made it their ally; in the future, no commander can be successful who does not know how to use it to aid his operations and to limit those of the enemy.

The mission and some of the factors of military situations have been discussed. They serve to limit and define the practicable courses of action open to your own forces. There remains the variable, the enemy. The constants can be used to determine the limits within which he is physically capable of acting. The commander then must reach his decision and fulfill his mission in spite of the enemy. But knowing everything the enemy can do to hinder his operation, his dispositions must be such that he is constantly ready to meet the principal eventualities.

That is what Napoleon meant when he wrote: "Chance remains always a mystery to mediocre spirits and becomes a reality to superior men."

The estimate of the situation removes the mystery from chance and makes it a reality. The genius of Napoleon penetrated the method. The researches of military students since his time have clarified the process so that it is available to every soldier. No excuse will avail the commander whose decision is based on unforeseen chances.

"His tactics left nothing to chance"; Weygand wrote of Turenne, "knowledge of the enemy, scrutiny of the terrain,

estimating of possibilities—everything was taken into account. . . . He could make up his mind because he knew; he could persist in what he had made up his mind to do, because he had meditated long over his decision and for him it had taken on the semblance of truth. Hence, his exceptional moral courage and strength of character."

Knowledge, the acceptance of calculated chances, is involved in the decision, the foremost duty of the commander. "Practically all critical decisions," wrote Hindenburg, "certainly not military decisions only, will always involve heavy risks. Indeed, the greatness of an action is mainly to be appreciated and measured by the question whether much was at stake. When a commander on the battlefield throws in his last reserves he is only doing what his country rightly demands of him. He accepts full responsibility and finds the courage to take the last decisive step without which victory cannot be won. A commander who cannot or will not dare to stake his last resources for the sake of victory is committing a crime towards his own people. If his blow fails, he is certain to have the curses and scorn of weaklings and cowards upon his head. That is always the fate of soldiers. To act only on absolutely safe calculations, or win laurels which are not dependent on the courage to take responsibility, is to banish the very elements of greatness."

APPENDIX 1

THE AMERICAN OUTLINE FOR A COMMANDER'S ESTIMATE OF THE SITUATION*

1. MISSION.
   - *a.* State the mission assigned by higher authority or deduced from the instructions from that source.
   - *b.* (Only when necessary.) Analyze the mission briefly. If it contains multiple objectives, determine their relative importance. If the time factor in the mission is so urgent as to tend toward a definite line of action in spite of other considerations, a statement to that effect should be made. If the estimate is to decide on the best line of action to attain an intermediate objective

*See *Combat Orders*, C. & G.S.S., 1937, for detailed discussion and procedure in using this outline.

(contingent mission) toward the accomplishment of a mission extended in time and space, the contingent mission should be deduced in this subparagraph.

2. THE SITUATION AND OPPOSING LINES OF ACTION.

a. Considerations affecting the opposing lines of action.—Consider, in connection with your mission, such of the following, or any other, factors in the situation which will influence your choice of a line of action as well as those which affect the physical capabilities of the enemy to act adversely:

RELATIVE COMBAT POWER, including:
- Numerical strength
- Composition
- Arms and armament
- Combat efficiency, including:
  - Physical condition
  - Morale
  - Training
  - Battle experience
  - Leadership
- Dispositions (as they affect the disposable force in the immediate situation).
- Assistance to be expected from neighboring troops.

REINFORCEMENTS

TIME AND SPACE (*including necessary troop movements and the time required*)

TERRAIN, *including:*
- Observation
- Field of fire
- Concealment and cover
- Obstacles
- Routes of communication (including influence on troop movements, evacuation, and supply)
- Essential terrain objectives
- Corridors

DISPOSITIONS (*as predisposing toward or against a certain line of action*)

SIGNAL COMMUNICATIONS

WEATHER

STATUS OF SUPPLY AND EVACUATION (*including sufficiency in the immediate situation and maintenance in the future. In large commands this information is obtained from G-4, who may be called upon to submit a G-4 Estimate of the Situation.*)

ENEMY'S KNOWLEDGE OF OUR STRENGTH AND DISPOSITIONS (*secrecy*)

HOSTILE TACTICAL DOCTRINES

CHARACTER OF THE ENEMY COMMANDER

Use a separate subparagraph for the consideration of each factor. First state the facts briefly. Then state your deductions of the effect of this factor on your choice of a line of action as well as on the enemy capabilities (favoring, limiting, or preventing certain lines of action). Some factors will affect only your lines of action and others only the enemy's. This list of factors is not complete and is only suggestive. Only those factors which have an actual effect on your choice of a line of action or on the physical capabilities of the enemy to act should receive written discussion.

b. Enemy capabilities.—As a result of these deductions list, in general terms only, all possible lines of action, within the physical capabilities of the enemy, which can interfere with the accomplishment of your mission.

c. Own lines of action.—List, in general terms only, all reasonable and practicable lines of action open to you which, if successful, will accomplish or facilitate the accomplishment of your mission. In simple situations and in cases involving small commands it usually will be possible to eliminate all but one of your own lines of action by the deductions made in paragraph 2 *a*. In such a case the analyses and comparisons made in paragraphs 3 and 4 are omitted and the estimate is completed by a statement of the decision.

3. ANALYSIS OF THE OPPOSING LINES OF ACTION.—Review mentally what will happen under all of the possible com-

binations if each of your lines of action were opposed by each of the hostile capabilities. This is to determine the degree of success, toward the accomplishment of your mission, that can be expected from each of your lines of action, and to discover the weakness of each when tested against each of the capabilities of the enemy. From these mental analyses, state briefly such of your conclusions as have an important bearing on your choice of a line of action.

4. COMPARISON OF OWN LINES OF ACTION.—With reference to each of your own lines of action, determine and state the decisive factor or factors that lead you to discard or adopt it and state, in conclusion, which line of action is most advantageous for carrying out your mission whatever capability the enemy may follow. This determination will result from balancing mentally the comparative advantages and disadvantages of your own lines of action, from judging and weighing their relative merits. It will require a mental review of the deductions and conclusions made in paragraphs 2 and 3.

5. DECISION.—The scope of the decision will vary within wide limits. The judgment of the commander is indicated by his ability to choose the moment when a decision to change the line of action should be announced and to determine the completeness of the decision warranted by the situation at that moment. A running estimate, constantly revised as information is accumulated, as the factors of time and space become limited, as the need for action becomes urgent, results in a decision which is evolved, element by element. The estimate made at any definite time should conclude with a decision as complete as the situation at that specific time warrants. The *basic decision* should be brief and state, in terms of unmistakable meaning, the line of action the *command as a whole* is to adopt to meet the *immediate situation*. A complete *basic decision* should include a statement of *what* the command is to do, and *when*, *where*, and *how* it will be done; a statement of *why* the action is undertaken may be included if desirable. The minimum *basic decision* may include only *what* the command is to do, the other elements being decided as the situation develops. The scope of the decision, which is warranted by the situation, must be determined by the force commander.

APPENDIX 2

A GERMAN OUTLINE FOR AN ESTIMATE OF THE SITUATION

Every decision is based on the following:

Mission—type of operation
The enemy
Terrain
Time and space
Own forces; condition, organization and composition.

ESTIMATE OF THE SITUATION

WHAT SHALL I DO?

1. BEGIN WITH THE MISSION, which should not be repeated in the exact words in which it is given. For example: The mission of the regiment gained extreme importance through the report that....., or: In order to protect the south flank of the division the regiment must reach the heights at.....

WHAT CAN I DO?

2. WHAT IS THE ENEMY DOING? Careful calculations (of time and space) should clearly indicate when the enemy can reach....., where he is at the present time, and when (the terrain can be indicated) the enemy can reach.....(the indicated terrain).

What is the composition of the enemy? (His leadership?)
How strong is he and what is his situation? Organization—reserves—range of artillery?
What is the situation from the enemy point of view, and consequently, what should his correct tactical action be?

The psychological evaluation of reports. (Morale factors)
From the above a logical conclusion should be drawn as to the influence the enemy can exercise upon our mission.

WAS THE HOSTILE SITUATION known to the higher commander at the time the mission was given as it has developed since that time?
Is it necessary to change the mission wholly or in part on the basis of the changed hostile situation?
The mission will not be changed without extraordinary reason or without thorough analysis. (In case of a

basic change, the decision will be reported immediately to the higher commander.)

TYPE OF OPERATION is decided upon in accordance with our own situation—Where are our troops; reserves, support of adjacent troops; can the action of the troops be speeded up? Situation of our troops; ammunition situation; are we in our own country?

Also whether the action is to be:

Attack
Defense
Delaying action
Pursuit
Withdrawal
} And preparations for them.

INFLUENCE OF THE TERRAIN upon the form of combat selected. Roads; woods; villages; heights for defensive positions; natural obstacles.

Only in case of extremely difficult terrain will the selection of the type of combat be influenced by it.

In case of attack without development (meeting engagement) test the terrain for the conduct of the attack—zones of action—main effort.

Employment of artillery and heavy weapons—objective of the attack.

In case of attack after development examine the terrain for the location of the development area—protection of the envelopment—routes for the approach march—the terrain you will fight over leading into the enemy position.

In case of defense examine the terrain for superior observation toward the enemy—the disposition of your forces—employment of the heavy weapons and artillery (defense positions)—employment of reserves (counter-attack)—the protection of natural or quickly constructed obstacles.

In delaying action is the terrain especially suitable for the employment of the forces? Employment of heavy weapons and artillery (reaching deeply into the hostile lanes of approach of the enemy)—combat in the area between positions (gaining of time).

In case of pursuit it is essential to determine the terrain in which the pursuit forces with the greatest range of fire can be employed.

Select observation points with the most extensive observation.

Good roads and a favorable road net for the employment of mobile and rapidly moving forces.

For withdrawal, good withdrawal routes are the deciding factors in the execution—positions with the possibility of warding off flanking operations.

WHAT SHALL I ORDER?

3. THE DECISION follows from this logical development of reasoning.

THE DECISION MUST BE SHORT; clear sentences.

It contains in general only:

(1) The type of combat and the location of the main effort.

(2) The execution (for example: the employment of available reserves).

NOTES

The outstanding characteristic of the German estimate is the dynamic attitude adopted. "What is the enemy doing?" is asked rather than "What is the enemy situation." The logical foundation of the German estimate is the third method stated on page 42. Time and space calculations, the hostile strength and situation, and your own situation and mission determine the decision as to the type of action, that is, attack, defense, delaying action, pursuit, withdrawal, etc. When this has been decided the supplementary decisions as to time, place, employment of subordinate forces, etc., are determined from consideration of the terrain, etc.

It is especially noteworthy that in every estimate the commander considers whether the mission given him is in accord with the situation at the time he makes his decision. He is required to consider whether or not he should abandon his mission. In case he changes his mission he reports his decision to the higher commander. This varies from the practice of all other armies which do not permit a change of mission as long as the officer who assigned it can be reached and informed of the changed circumstances.

The commander, while avoiding preconceived ideas of enemy intentions, decides what the correct tactical action of the enemy should be. He will, if he lacks information, consider that the enemy will take the attitude most prejudicial to his projected plans.

From these various considerations "The leader synthesises with rigorous and persuasive logic, the image of the situation as it appears to him. He finally fixes his decision with brevity and clarity, avoiding schemes and models. He should not during his work count on anything except his knowledge of principles and his own good sense. The order in which the elements that he should examine are considered should not be thought of as a rigid scheme. The experience and skill which he has acquired will confer on him a liberty of thought, thanks to which he can expose his own decisions with greater brevity."

German practice is in agreement with American practice in breaking down the decision into a basic decision and supplementary decisions.

APPENDIX 3

AN EXTRACT FROM FRENCH INSTRUCTIONS FOR THE ESTIMATE OF THE SITUATION*

ELEMENTS OF THE DECISION

The principal elements which the commander, called upon to decide on the tactical employment of a unit, should examine are:

The mission.

His means and the time at his disposal.

The terrain.

The strength and capabilities of the enemy.

The analysis of these elements and then their synthesis constitutes the method of reasoning for the operations of war.

It is important that they be considered in connection with the concrete circumstances of the situation.

An action of war, in effect, is never isolated in time and space; the commander should, then, prior to any other study, consider carefully the diverse conditions which make up the general situation within the framework of which is the operation envisaged.

He will then be in a position to proceed successfully with the examination of the factors which are discussed in the following paragraphs.

THE MISSION

The mission should define clearly the object to be attained. It is stated precisely and should not lend itself to any ambiguity or interpretation. It pledges the responsibility of the commander who gives it. It is imperative for the commander who receives it.

The mission should always be present in the mind of the commander in the conception of his operation as well as in the execution.

All the dispositions he makes further its accomplishment by conforming plainly and constantly to its spirit.

The commander follows the execution of it without deviation and until it is fulfilled.

**Instruction sur l'emploi tactique de grandes unites.*

His Means

The commander should possess an exact knowledge of the means, both in personnel and matériel, placed at his disposal for the operation.

Considering the time at his disposal, he deduces the amplitude to give his maneuver, by a judicious evaluation of their capabilities.

In war, the worth of a command is measured by its capacity to attack and to resist.

But fire-power and the intensity of the struggle exact a rapid usury from even the most experienced troops. It is therefore necessary to manage indispensable respites to units to regain their breath, reconstitute organizations, and resupply them.

In all of his combinations the commander should envisage the probable repercussion of events on the morale of his troops.

In this respect the first engagements of a war require special attention.

The worth and cohesion of green troops that participate should be estimated with prudence and should lead the commander to assure them a particularly energetic material support.

It is always preferable to keep units under the habitual leaders; the breaking of organization ties can never be other than an expedient temporarily imposed by circumstances.

Perfect knowledge of the use and functioning of matériel, particularly of armament, signal communications and transport, is the basis of all coordinating action.

It is equally indispensable for the commander to know the possibilities of new weapons, particularly of those which have not made their appearance on the battlefield. He will often find a factor of surprise in their employment and an incontestable superiority over an adversary not provided with them.

The Terrain

Terrain exercises a tyrannical influence over every operation.

Within the framework of the operation envisaged, and according to the scale of the effectives to be placed in action, the terrain is studied, first on the map, then by terrestrial or aerial observation, with a view to utilizing to the full its advantages, of respecting its limitations, and then, in an objective

fashion, with respect to the possibilities that it offers to the enemy's maneuver.

In an operation of an army corps or a division, the study of the terrain is undertaken primarily from the point of view of the combined arms.

In this respect the relief and the nature of the terrain have especial interest. Terrain generally open, undulating, easily maneuvered over, without great natural obstacles, lends itself on account of the ease of observation to coordination of the arms and reciprocal support of the units in combat. Motorized and mechanized units of the two adversaries will be fruitfully employed on it.

On it fire is efficacious, movement rapid, deployment easy, the exercise of command is facilitated. However, the great open plains lend themselves poorly to offensive action of infantry and tanks, at least in war of movement, because of the extent of the fields of fire for an organized position and the power accruing to the aviation.

Terrain, well wooded, broken with streams, hilly, makes movement difficult. It requires, for the infantry, a larger number of effectives, but facilitates its elementary maneuvers. The effectiveness of the armament is limited by the obstacles and the cover; the combination of the fires of the infantry and the artillery, the exercise of command, are precarious because of the difficulties of observation.

The deployment of the means is difficult, although their concealment should be assured.

The action of the tanks is limited or entirely prevented by obstacles, their moral effect is diminished by the canalization of their employment.

The study of the terrain, from the tactical point of view, leads the commander:

(1) In the defensive, to choose the ground on which he intends to place his barrage of fires.

(2) In the offensive, to determine directions and objectives, such as compartments of terrain protected from the view and distant fires of the enemy, in which the action of the combined arms can develop favorably.

The Enemy

The commander makes a complete examination of the capabilities of the enemy. He exploits for this purpose:

(1) On the one hand, the information collected to that time on the general worth of the adversary (armament, methods of combat, lines of communication, etc.).

(2) On the other hand, the information more particularly applicable to the operation envisaged and which he has had collected by his own agencies for this purpose.

He examines in this manner all the possibilities of maneuver open to the enemy in the order of urgency and probability; because he cannot know the real intentions of the enemy, which, anyway, are variable in the course of execution, a commander cannot hope to conduct his maneuver well unless he is constantly ready, by his dispositions, to meet the principal eventualities.

Expression of the Decision

The conception of the commander is translated by a decision which manifests his will to all.

This power of decision confers on a commander a responsibility which belongs to him alone and which constitutes one of his highest prerogatives.

The decision should indicate clearly the form and the essential characteristics of the maneuver conceived by the commander. It details to each of his immediate subordinates his mission and his means.

It should be made in ample time, taking account of the necessary time for transmission and execution of the orders.

The information of the enemy will always be incomplete: to await complete information before acting is to risk inaction.

NOTES

The French Army does not teach the estimate in a formal sequence. Nevertheless, their custom is to follow the approximate sequence used in the American estimate. "An action of war, in effect, is never isolated in time and space; the commander should, then, prior to any other study, consider carefully the diverse conditions which make up the general situation within the framework of which is the operation envisaged."

French instructions warn against any effort to determine enemy intentions and direct that the commander should be constantly ready, by his dispositions, to meet the principal eventualities.

The instructions with reference to green troops and the moral effect and losses of battle are worthy of note.

The decision reached in French practice would be called the commander's plan in American practice.

APPENDIX 4

BRITISH INSTRUCTION FOR AN ESTIMATE OF THE SITUATION

APPRECIATIONS

1. An appreciation is a military review of the situation, based on all available information, culminating in a statement of the measures recommended to meet it.

2. A distinction must be drawn between (i) appreciations in connection with subjects elaborated in peace time, such as plans of campaign, and (ii) appreciations of strategical or tactical problems in the field which, in the case of minor tactical problems, may not be committed to paper. In the former, rapidity in compilation is immaterial, every known or surmised factor, however slightly it may bear on the situation, must be considered and recorded, since future developments may materially alter its importance. In the latter, rapidity is generally all-important, and the time available will seldom admit of all the factors being recorded, though they should all receive consideration.

3. The value of method is very apparent in war, where there are so many disturbing influences and where rapidity is often of the utmost importance. Constant practice in appreciating strategical and tactical situations is therefore essential. The habit of making appreciations teaches an officer to arrange his facts methodically and trains him to arrive rapidly at a logical and sound conclusion.

4. Whether appreciations are written or delivered verbally, it is of advantage to follow a logical sequence of ideas, as this enables the argument to be formulated and grasped more rapidly.

The accepted sequence is:

i. The object.
ii. Considerations which affect the attainment of this object.
iii. Courses open to the two sides.
iv. The plan.

This sequence is applicable to almost all strategical and tactical situations.

An opening statement of the situation and in some cases arguments, may be necessary, but the object must always be clearly stated in a separate paragraph.

From the plan in the final paragraph the staff must be able to take appropriate action and write the necessary orders.

5. The heading (if the appreciation be written) should give the title of the appreciation and state from whose point of view it is being made. The place where, and the time and date at which the situation is being appreciated, should also be included.

6. The object should be clearly and concisely given and should be kept in view throughout the appreciation. It is important not to confuse "object" with "objective." The object can often be stated at the outset, but the selection of the objective, or objectives, to attain that object may only be possible as a result of an appreciation of the situation.

7. Among the factors which might influence the attainment of the object the following may be mentioned: the position, relative strength, armament, efficiency and morale of the opposing forces, including probable reinforcements and the relative resources in men, money, and material of the belligerents, the political situation, topographical and climatic conditions, time and space (an essential consideration in practically every military appreciation), vulnerable points, character of the opposing commander, communications, supply, and transport. It should, however, be remembered that information regarding these and kindred matters is not of itself of great value. It is the deductions and inferences to be derived from such information that are chiefly needed.

In the case of proposed movements by sea, rail, or mechanical transport, sufficient detail should be given to show that they are within the capacity of the means of transport available and that the necessary arrangements have been worked out.

Though the above and other factors may have to be considered, nothing should be written down that is not essential to the solution of the particular problem under consideration and that has not a definite bearing on it.

8. The arguments for and against each course open to either side should be briefly discussed, and their practicability proved if necessary. A distinction should be drawn between established facts and assumptions, since on the accuracy of the latter the soundness of the arguments is largely dependent.

It is usually better to consider the courses open to one's own side before dealing with those open to the enemy. To reverse this procedure tends towards a surrender of the initiative. When, however, the initiative obviously rests with the enemy, it may be advisable to consider his probable action first.

It is important to visualize the situation from the enemy's point of view and, in deciding upon his probable action, to credit him with acting wisely unless he has shown in the past that he is likely to act otherwise.

The discussion should lead logically to the plan proposed.

9. The plan of action should be definite, clear, and practical. It should be stated concisely, but in sufficient detail for a trained staff officer to be able to draft the orders required to carry it out. It should, where necessary, be illustrated on a map or by means of a diagram in order that its salient points may be grasped more quickly.

The more simple the plan the greater chance there is of its successful execution; giving greater rapidity, it usually allows the initiative to be seized. The soundness of every plan will depend upon the correct application of the principles of war as enunciated in Field Service Regulations.*

NOTES

British and American practice are very similar in the first two paragraphs of the estimate. After detailed consideration of the situation, the courses of action open to the two sides are stated. These courses of action are briefly discussed and the decision made. Enemy's probable action is deduced when it is believed warranted.

The British do not follow American and French practice in opposing the possible enemy actions to their own courses of action to determine what could happen in each eventuality, although in practice the effect of enemy action is considered as each plan is discussed.

The decision reached as a result of the estimate is the same as what is called the commander's plan in American practice.

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*Abstracted from: *Training Regulations, 1934*—Great Britain. War Office.

Section 2

ABSTRACTS OF FOREIGN-LANGUAGE ARTICLES

This section contains abstracts of important articles from foreign military periodicals; the remaining articles for each magazine are listed in Section 4.

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CAVALRY IN LIAISON WITH MOTORIZED INFANTRY DIVISIONS

["La cavalerie en liaison avec les divisions d'infanterie motorisées." By General X . . . *Revue de Cavalerie*, September-October 1936.]

Abstracted by Major L.K. Truscott, Jr., Cavalry

The author outlines the general composition of motorized divisions (French) and indicates their general characteristics. He discusses likely missions for motorized divisions, the requirements for information and security in performing these missions, and concludes that close cooperation with air forces and cavalry (mechanized, motorized and horse) is essential for the successful accomplishment of missions by motorized divisions.

In discussing the characteristics that affect the employment of motorized divisions, the author states that the motorized division has the approximate composition of the normal division except that the artillery, cavalry, engineers, signal troops, trains, and services are motorized, and the regiments of infantry can be motorized by trucks from the general reserve. Motorized divisions have the power of normal divisions; they can defend against a strong attack, a front of 4 to 5 miles, on which their organic 75's can place stopping fires on about 1,500 to 2,000 yards, and their organic 155's on about 500 to 1,000 yards. The

motorized divisions have capacity for long rapid movements and can cover 100 to 150 miles a day. The size of a motorized division makes it sensitive: its road space, with infantry on foot, is 40 miles, of which 42.5 is required for the 1,600 motor vehicles. With the infantry in trucks (from the general reserve) the road space exceeds 68 miles. The division, therefore, is extremely vulnerable to air attack, long range artillery fire, and raids by mechanized forces. As in all fast moving troops, command is difficult; command requires quick decisions; quick decisions require perfect reconnaisasnce and communications. The most difficult decision is when to detruck, and after the decision is made, 4 to 5 hours are required to dispose the division for combat. Besides the antiaircraft security which is especially required, the motorized division requires terrestrial security which should extend in advance of the bulk of the division in movement a distance of about 80 to 100 yards, representing in space the time required for disposing the division to meet a mechanized threat. For reconnaissance and security, the division organically has only the motorcycle platoons of the infantry regiments and the reconnaissance groups consisting of motorcycles, motorized machine guns, and a few armored cars.

The author sees the motorized divisions employed for the same missions, offensive and defensive, as the normal divisions. As "strategical destinations" he lists three: in general reserve to reinforce a front, stabilized or not, in attack or defense; in intervals or gaps between armies or groups of armies to exploit a success by offensive action, or to reestablish a jeopardized situation by defensive action or counterattack; and, in a wide flank maneuver.

The employment in general reserve to reinforce a front the author considers without object because for stabilized situations, normal divisions can fulfill any reinforcing mission appropriate for motorized divisions, as demonstrated by experience in the last war. In mobile situations, to reinforce a front having some stability, it would suffice if infantry trains and machine guns of normal divisions were motorized, the infantry elements could be moved in trucks from the general reserve, and the organic artillery replaced by 75's and 155's (motorized) from the general reserve, thus avoiding the expense and sacrifice of organizing and maintaining the motorized divisions. He concludes that entirely motorized divisions are maintained for operations in free terrain, and that security is an obligation.

As to the employment of the motorized divisions in an interval to exploit a success, the author believes that speed is the first essential, otherwise the enemy may reestablish himself. Two or three motorized divisions will generally be used, and therefore the gap must be 12 to 18 miles in width. The high command furnishes the motorized divisions with all available information, but more definite and precise information will be necessary. In addition to the information furnished by the air service, the divisions must have ground reconnaissance that will answer the questions: Where is the new enemy front? Where will the next battle take place? Is it necessary to detruck? Should movement by truck be continued? Reconnaissance elements that answer these questions must be able to break through fragmentary resistances of isolated automatic arms, or fractions of all arms and must be constituted of armored vehicles followed by machine guns in cross-country carriers and by mechanized light artillery. Maneuvers of overcoming these resistances will determine the hostile line and the width and depth of the gap. These detachments will require specially adapted matériel, and specialized personnel. In addition to the information required, the divisions must have security frequently for daylight movements. Utilizing all available roads, the disposition in width provides some security, but the front must be covered, and in proportion to the penetration into the gap, security for the flanks must be provided; this security must be in place when the motorized elements begin movement, otherwise the movement is precarious. Further, the security must be sufficient in strength to hold for the five or six hours required for disposing the motorized divisions for combat. Since division reconnaissance groups have not strength sufficient to perform all these necessary tasks, mechanized, motorized, and light cavalry divisions are necessary.

Employment of motorized divisions to fill a gap in a defensive situation is much the same as the employment in gaps in offensive situations. The first necessity, if the enemy is in close contact, is to seize a line upon which the main body can hold and offer resistance; next, and especially important, it is necessary to establish contact with friendly forces on the shoulders of the gap, and work in close cooperation with them. Units are necessary that can move across country, and which have numerous and rapid means of communication. If the enemy is not in close contact, the commander of the motorized divisions

must determine the situation and delay the enemy advance long enough to dispose his command. He requires immediate and distant security, and the distant security has the double task of obtaining information and delaying the enemy. The composition of these distant security detachments should be armored vehicles, machine guns in cross-country carriers, anti-tank means, and light artillery.

The author emphasizes the importance of the flank maneuver in war, and he discusses the purposes and execution of flank maneuvers at some length. He believes that in any war of the future, the advantage of the flank maneuver can be obtained only by the general utilization of motor transport seconded by aerial forces. In flank maneuvers of great forces he foresees that the initial wave of motors will be followed by utilization of all means of transport, rail, marching, etc. For the flank maneuver, the commander has greater need of information than in interior operations; he must determine the hostile flanks in order to direct his mass as required by the situation, and to give his maneuver the necessary width. Air reconnaissance is essential, but must be amplified by ground reconnaissance. In addition, the motorized command must have a zone of free terrain for displacing the bulk of the force in order to gain possession of vital points necessary to the ultimate success of the operation. The author concludes that if motorized divisions are an essential element in flank maneuvers, their employment can be conceived only in close cooperation with cavalry, mechanized, motorized, and horse.

The mechanized divisions, because of greater mobility, are indicated for covering the front and the exposed flank. Horse cavalry can be used on interior flanks where its mobility is ample for the missions required. Both can be reinforced as necessary to enable the accomplishment of assigned missions. The first task of these detachments is to establish a barrier behind which the motorized bulk can move in relative security. Security is not the only mission; information is important, and other appropriate missions such as seizing points essential for the development of the maneuver, delaying a hostile advance, or raiding hostile communications, may be assigned. Whatever be the tasks assigned, the employment, not of small reconnaissance groups, but of large units, light and mobile, trained and organized for such operations, will be required.

In summarizing, the author concludes that the motorized divisions can fulfill their appropriate missions only in close cooperation with air forces and mechanized cavalry especially organized and trained for the tasks. He points out that the missions indicated are the normal missions for which cavalry has been constituted and trained, and that the motorized divisions can perform these missions with organic elements only by detaching important elements that will be important in the principal action, or by having provided in each motorized division mechanized elements which would increase the already formidable size.

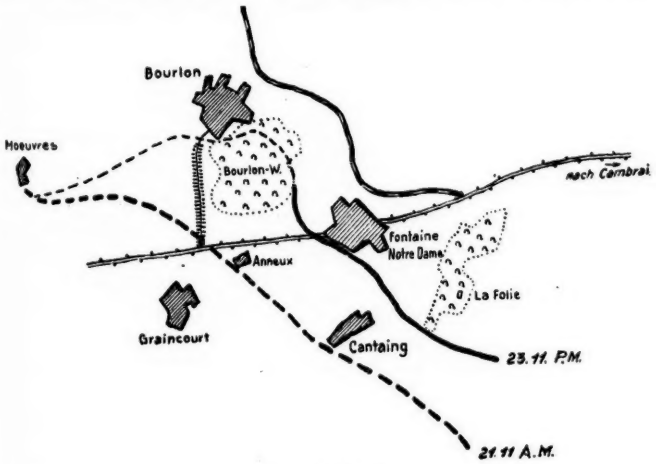
TANKS AND ANTITANK DEFENSE DURING THE WORLD WAR*

(PART II)

["Kampfwagen und Abwehr während des Weltkrieges." *Sanct Christophorus*, November, December 1936.]

Abstracted by Lieutenant Colonel S.J. Heidner, Infantry

On 22 November four tanks, attacking between the Boulon Woods and Moeuvres, broke through the infantry position and turned towards the west. (See Sketch No. 2) One of them



Sketch No. 2

*See Quarterly No. 65 (June 1937, page 55) for first installment of this series.

tipped over in a German trench and the crew was killed with hand grenades, while the remaining three were destroyed by artillery fire. Although it was presumptuous to attack in broad daylight with four tanks, nevertheless the tanks succeeded in penetrating the infantry lines. Only one of them was destroyed in the infantry zone, and that happened only because it fell into a trench.

In the afternoon the newly-arrived German 119th Division recaptured Fontaine Notre Dame. Field pieces were pushed forward at once in the village for antitank defense and other artillery platoons were held in readiness with their teams hitched. Now at last, after three days of tank attacks, the organization of a systematic antitank defense was begun. The 119th Division held its new front with two battalions along the south edge of Fontaine, two battalions between that village and the La Folie Woods, and one battalion along the south edge of those woods. A number of field pieces were emplaced as antitank guns between Fontaine and La Folie Woods.

On 23 November the British planned to recapture Fontaine, and to take Bourlon and the Bourlon Woods. About noon, after a short but intense artillery bombardment, the 158th Brigade attacked Fontaine from the west and southwest. Twelve tanks supported the attack from Cantaing, and twelve more attacked along the main road. The British infantry was quickly pinned to the ground by flanking fire from the La Folie Woods and from Fontaine, but the tanks moved on unmolested. The German battalions on the open ground between Fontaine and La Folie Woods were unable to hold their position. The bulk fell back on La Folie Woods. But the British infantry did not follow; it remained pinned to the ground by fire from the woods.

The defenders of Fontaine had learned to give away and let the tanks pass, then to close the gap and open fire on the hostile infantry. That was the maneuver they now executed; it was facilitated because the houses offered shelter. The tanks, however, moved on through the village. Here fighting ensued which reflected glory to both sides. A few tanks were destroyed by antitank guns in the streets. The German infantrymen dodged into and behind houses to escape the oncoming tanks, and then fired on them from above and from the rear at point blank range with armor-piercing bullets or threw overcharged hand grenades under the tracks. The tanks that escaped ad-

vanced to the eastern exits of the village where they forced the defending infantry to take cover.

During the afternoon the Germans counterattacked with the aid of three fresh battalions, and were able to reestablish their front of the morning.

A second British attack was launched late in the afternoon against the northwest and west of Fontaine. The attacking infantry was stopped again, while the tanks, as before, broke through and entered the village. The tanks suffered heavy losses; those escaping destruction fell back under the cover of darkness.

One of the tanks shot down on this day had painted on it the caricature of a German soldier with his hands raised over his head. This mockery, nevertheless, truly depicted the ineffectiveness of German defense against the tanks.

The German 214th Division arrived in the sector and was placed in line on the right of the 119th Division. It placed a regiment along the south and east edges of the Bourlon Woods, and two battalions west of the woods.

While the fight for Fontaine was going on, the British 40th Division attacked Bourlon with its 121st Brigade from the west and with its 119th Brigade through the Bourlon Woods. Each brigade was supported by tanks. The 119th Brigade reached the north edge of the woods taking a large number of prisoners. One German battalion had 407 missing. The infantry of the 121st Brigade was stopped west of the Bourlon Woods by an artillery barrage, but the tanks penetrated the German position. A panic, which began in the German lines, subsided when a tank was struck and set on fire by the artillery in sight of everyone. Antiaircraft artillery took part in the antitank defense. But in the afternoon tanks pushed into Bourlon, principally through the gap west of the Bourlon Woods. Then five battalions of German artillery went into action north of the village to prevent the debouchment of about ten tanks! A small part of this artillery would have sufficed if single pieces had been pushed forward in time.

On 24 November there was no fighting in which tanks came into evidence. At 1:15 PM the Germans received a report that 30 tanks and strong cavalry elements were assembled in the area between Graincourt, Anneux, and the main road. Captain von Richthofen took off with a group of 30 airplanes to attack the tanks, but the group sighted 115 hostile airplanes of which 39

were engaged, so there was neither time nor opportunity to attack the tanks. A German counterattack on this day in which artillery platoons followed closely behind the infantry for antitank defense, retook Bourlon.

No important fighting took place on the 25th and 26th. The German 3d Guard Division now held the front from west of Bourlon, along the south edge of Bourlon, and along the east edge of the Bourlon Woods. The 119th Division extended from Fontaine to LaFolie Woods inclusive. Each division had three platoons of artillery emplaced along their front as antitank guns.

On 27 November the British attacked Fontaine and to the west thereof with the Guard and 62d Divisions. Both divisions were supported by large numbers of tanks.

The Germans were expecting the attack, and beginning at 7:15 AM, they fired several interdiction concentrations. Shortly thereafter the British put down a heavy barrage, and forty-five minutes later they launched their attack.

The area about Fontaine was so clouded with smoke that observation became difficult. South of Fontaine the British attack was stopped. Between Fontaine and the Bourlon Woods, tanks broke through the front of the 9th Grenadiers of the German 3d Guard Division, and this time infantry of the British Guard Division followed. Tanks and elements of the British Guards turned to the left and attacked the Grenadiers from the rear. The Grenadiers broke, and it was due only to the heavy smoke that a large number of them were able to escape capture.

Other British Guards, supported by tanks, turned to the south and entered Fontaine. The guns set up for antitank defense in the village were soon put out of action. One tank blocked a company in its shelter, and the entire company was taken prisoner.

The German reserve battalions were able to establish a defensive front along the railroad embankment which was attacked weakly only.

In front of Bourlon the German position was penetrated by tanks and the defenders fled to the rear. The tanks were fired on at close range by the antitank guns, and many of them were destroyed. The barricades in the streets of Bourlon restricted the maneuvering of the tanks that entered the village, and two of them were destroyed there with overcharged grenades. In

the open, however, such attempts to destroy the tanks failed in spite of the fact that the prospect of capturing tobacco and food was a powerful incentive to the Germans. Since the infantry on this front did not follow the tanks, the tanks soon had to turn back, and so the attack miscarried here.

Five fresh German battalions joined a counterattack at Fontaine which restored the original position. The British had neglected to reform their tanks after the attack to resist the counterattacks which they must have expected. Experience had not yet taught them to do this.

The defenders learned during this battle that both active and passive means of antitank defense must be used, and that guns emplaced for antitank defense must be located immediately in rear of the infantry lines. As on previous occasions, a number of platoons had been held in readiness in rear with teams hitched for antitank defense. These guns invariably arrived too late.

On 30 November a German counteroffensive was begun which, in a short time, regained all the ground that had been lost in the battle of Cambrai, and actually gained some new ground toward the south. The German soldier succeeded without tanks in doing what the British had done with tanks. The exhausted British tanks corps was not used against the German counteroffensive.

The British concluded from the battle at Cambrai that infantry could not advance without accompanying tanks even though leading tanks had broken through the enemy's main position. They also concluded that two types of combat tanks were necessary: a heavy tank, long enough to cross wide trenches, to make the penetration; and a medium fast tank, with a radius of action of over 65 miles, to exploit the success. The British also believed that two types of engineer tanks were necessary: one type for carrying heavy iron beams with which to construct crossings over canals and ditches; and another for pushing heavy rollers which would detonate any hostile antitank mines. The British had expected the Germans to use antitank mines on a large scale, and were greatly surprised to learn that they had made practically no use of this means of defense. Besides these various types of tanks, the British also wanted armored cars constructed to be used in cooperation with the cavalry in the open ground beyond the trench systems.

The Germans believed, after this battle, that tanks employed in mass could give decisive results, and immediately gave first priority to the construction of their own tanks. By the end of October 1917, the first German A7V tank was completed. Twenty-eight of this type were to be at the front by the end of February, and ten more were authorized. The A7V tanks were to be armed with a gun and four machine guns. All the British tanks captured at Cambrai were to be reconditioned and placed in service. The Germans decided that a new means of antitank defense must be found for the infantry. Tank rifles and a 13-mm machine gun were considered. Beginning with December, flat trajectory mounts for light trench mortars were issued. A little later each army on the Western Front was supplied with ten field pieces mounted for antitank defense on ordinary trucks. Instructions provided that single light field pieces should be emplaced immediately behind the front infantry lines for antitank defense even at the expense of barrage artillery in quiet sectors, that tank-secure terrain was to be utilized in choosing defensive positions, and that tank traps were to be built. Descriptions and sketches of hostile tanks, showing their vulnerable places, were issued to the troops.

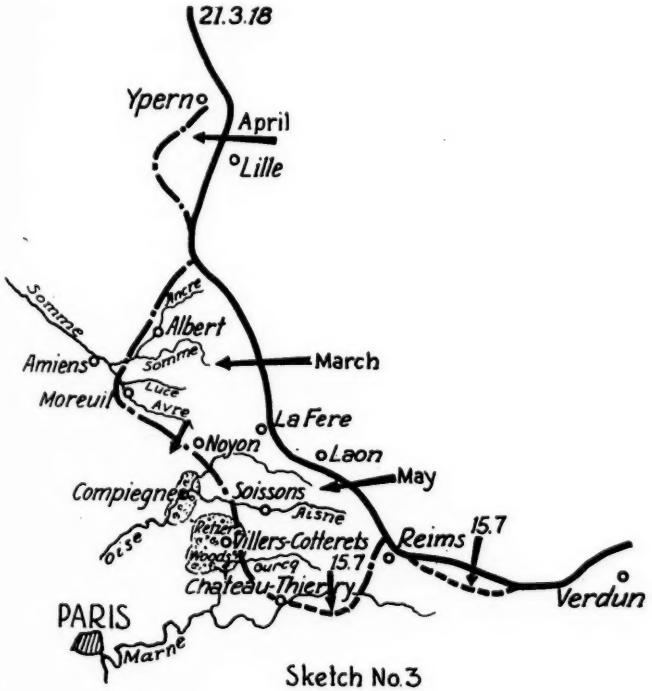
The third act of the tank drama ended at Cambrai with the tank superior to any defenses used against it.

The spring of 1918 again saw the German assault columns leaving their trenches. (See Sketch No. 3) The British tank corps had been increased to five brigades with a total of 13 battalions. They expected a German attack, and distributed their tanks by battalion along the entire front where an attack was expected, to be employed in counterattacks with the infantry. The first two days of the battle were waged in the British trench system. Only where tanks cooperated was the British infantry able to recapture any ground, but since the tanks were dispersed along the entire front, no decisive counterattack was possible.

At the end of the second day the British began their retirement. On account of their limited speed and radius of action, the tanks were unable to keep up. Many were captured as they ran out of fuel, others were destroyed by their crews to save them from this fate. The German infantryman, by his rapid advance, destroyed the weapon which in the preceding November had been able by itself to overrun German positions. The British tank corps ceased to exist as such: its personnel, which

had not suffered the losses of the infantry, rendered brave service in the Lewis machine-gun battalions.

During this offensive the German tank made its appearance. A few meeting engagements occurred between British and German tanks where they unintentionally fell upon each other.



Sketch No. 3

The new British medium tank now made its appearance. The tank corps was reorganized, and tanks were again employed. Seven medium tanks surprised two German battalions before they were deployed and killed or wounded over 400 men. It was evident that accompanying guns could not follow close enough behind the infantry to ward off tank attacks.

In May the Germans threw back the French from the Chemin des Dames. By storming impetuously forward, the Germans reached Soissons in the west and the Marne in the south. The British and French armies were at the end of their

strength; only the Americans, on whom all eyes were turned, could turn the tide. At this critical time the French launched their newly-completed Renault tanks against the Germans. These tanks gave the French infantrymen the strength to stop the German flood. From 21 May to 28 June, 196 Renault tanks had been employed on a narrow front, and yet only seven had been destroyed by German artillery or trench mortars.

The fourth tank act ended with the battle at Soissons. The French and British now had a much improved weapon. The new tanks were faster and had a radius of action about double that of the original tanks. Was there really any further chance for a German offensive if the enemy massed his tanks for counterattacks? And what would happen if the enemy took up the offensive? No new progress had been made in combatting the tanks. It is true that the 13-mm antitank rifle had appeared in March, but its effectiveness had not been demonstrated.

The Germans now prepared for a new offensive on each side of Rheims. (See Sketch No. 4) The front between the

Sketch No. 4

Aisne and the Marne was to be held. It was there in the Retzer Woods that the French counterattacks supported by Renault tanks had brought the previous German attack to a standstill. After all reliefs had been accomplished, there remained between the Aisne and the Marne eleven divisions in front line, seven in corps and army reserves, and several more behind these under the control of the group of armies and general headquarters. The sectors of the front-line divisions varied from two to two and a half miles in width. The divisions occupied them with

their three regiments in line. The battalions of the regiments were arranged one behind the other, and known respectively as combat, reserve, and rest battalions. An epidemic of influenza raged here, but no worse than on other parts of the front.

The experience in antitank defense gained at Cambrai seems not to have been transmitted to the divisions on this front. Each division had two field pieces emplaced for antitank defense, but they were as much as one and one-half miles behind the main line of resistance. Hence, with the aid of their tanks, the French without danger could overrun the German outpost zone and even penetrate the main line of resistance. This explains how the French were able to improve their position continually, with limited attacks, until at last they gained the impression that they could venture an offensive on a large scale.

The German position was only partially organized. There were no continuous trenches, and wire entanglements were only indicated. On and behind the main line of resistance, tall grain limited the field of fire. The responsible commanders should have had this grain either mowed or burned, and sufficient antitank guns emplaced to cover the area.

Realizing the embarrassment it would give the Germans if the rail center of Soissons could be brought under the fire of the French guns, General Mangin, commanding the French Tenth Army, undertook an attack to accomplish this. He planned first to capture a line of departure for tanks along the east edge of the Retzer Forest, and then to push the attack to the heights southwest of Soissons. (See Sketch No. 4)

The attack began 28 June, and the first part was carried out as planned. General Mangin observed that the German resistance was weakening, and now suggested that the entire German position between the Aisne and the Marne be taken. The commander of the French Sixth Army believed that he could with his own means carry out his part of the attack between the Marne and the Ourcq. The plan was approved, and on 9 July the Fifth Army, and a few days later the Ninth Army, were ordered to join the attack. So from a local attack there was developed the plan for a large-scale offensive with the object of reducing the entire German salient from Soissons to Rheims.

Tanks were allotted to the four armies as follows: to the Tenth, 346; to the Sixth, 147; to the Ninth, 90; and to the Fifth, 45. The Tenth Army, attacking toward Fere en Tarde-

nois, was to make the main effort. The Tenth and Sixth Armies were ordered to attack on 18 July, while the Ninth and Fifth Armies were not to attack until the next day.

In the meantime, on 15 July, the German offensive on both sides of Rheims was launched. The French had known about the German plans since 10 July, and had made plans to meet them. The offensive failed; only west of Rheims did the Germans reach the south bank of the Marne.

The Germans had expected a French attack on 14 July, the French national holiday. When that day passed without an attack, the Germans thought that the French were completely occupied in stopping the new German offensive, and that there would be no serious French attack. The French were able to keep all their preparations for the attack secret, so their attack on 18 July came as a complete surprise.

The attack started with a heavy artillery bombardment at 5:35 AM. It was not yet quite daylight, and the smoke shells fired by the French increased the obscurity. Suddenly, out of this semi-darkness, the tanks appeared. There were no guns to stop them. The main line of resistance was overrun, and the reserve and rest battalions were drawn into the action before they were aware of it. These battalions could not hold either. Due to the high grain, the tanks frequently got up to the artillery positions without being seen. How everything happened, no one knows. Regiments claimed that the enemy broke through in neighboring sectors, and divisions claimed the same. The artillery barrage had been too far forward, and the few guns emplaced for antitank defense could accomplish nothing. Only one thing is positive: everything developed very rapidly, so rapidly that no one could grasp the situation.

At 8:00 AM, General Mangin received reports stating that the attack was progressing as planned, whereupon he ordered the cavalry corps of the army to move its divisions forward. At 10:00 AM he placed three battalions of tanks, which had been held in army reserve, at the disposal of his two center corps. He directed that they were not to be employed until the front-line divisions could no longer progress without them. Soon after this the center of the Tenth Army came to a halt, probably for the forward displacement of its artillery. In the meantime the German corps and army reserve divisions had been rushed forward, and when the French attack was resumed it could make no progress. The three tank battalions had been

distributed over so wide a front that their effect was not felt. Had they been committed before the halt the effect might have been otherwise.

The north wing of the Tenth Army had been specifically directed to hold its position in order to prevent flanking fire from the north bank of the Aisne. The south wing, however, which was to advance with the center, failed to move too. No tanks had been attached to the south corps due to the difficult terrain. It became apparent that the German positions could not be taken without tanks.

The Sixth Army did not get to the German main line of resistance until 7:00 AM. It was then full daylight. The same thing now happened here that had happened at Cambrai. The German infantry disappeared in front of the attacking tanks, but closed in again in time to fire on the attacking infantry. The French infantry, however, was able to take the German main line of resistance and, at places, their regimental reserve line. On the north the Sixth Army was held up by flanking fire which resulted from the failure of the right of the Tenth Army.

The attack on 18 July had failed to give decisive results. A different allotment of tanks might have changed the situation. Either the tanks given to the Ninth and Fifth Armies should have been given to the Sixth Army, or all the tanks should have been given to the Tenth Army. Considering the other means available to the Tenth Army (it had 16 infantry divisions, 3 cavalry divisions, 1,545 guns, and 581 airplanes, while the Sixth Army with the same front had only 8 infantry divisions, 588 guns, and 562 airplanes), the best solution would have been to give all the tanks to the Tenth Army. In that case it should have been possible to revive the attack which had come to a standstill, and open a breach for the cavalry corps. In that connection, however, it is interesting to note that, although the cavalry had been ordered forward at 8:15 AM, it did not arrive at the French line of departure until 3:00 PM. By that time the reserve divisions had closed in. The first squadrons to arrive were forced to dismount and fight on foot by a few German machine gunners.

The French Tenth Army in a few hours had pushed forward about 5 miles and captured 10,000 men and 200 guns. The Sixth Army gained 2½ miles and took 2,000 prisoners and 50 guns. The French lost 62 tanks. The German front-line divi-

sions had been practically wiped out. Once more the enemy won a big victory by surprise. This victory turned the scales. The German offensive at Rheims was abandoned, and the evacuation of the south bank of the Marne was ordered. The 19th was a critical day for the Germans, but the French Ninth Army could not attack because its tanks had not arrived.

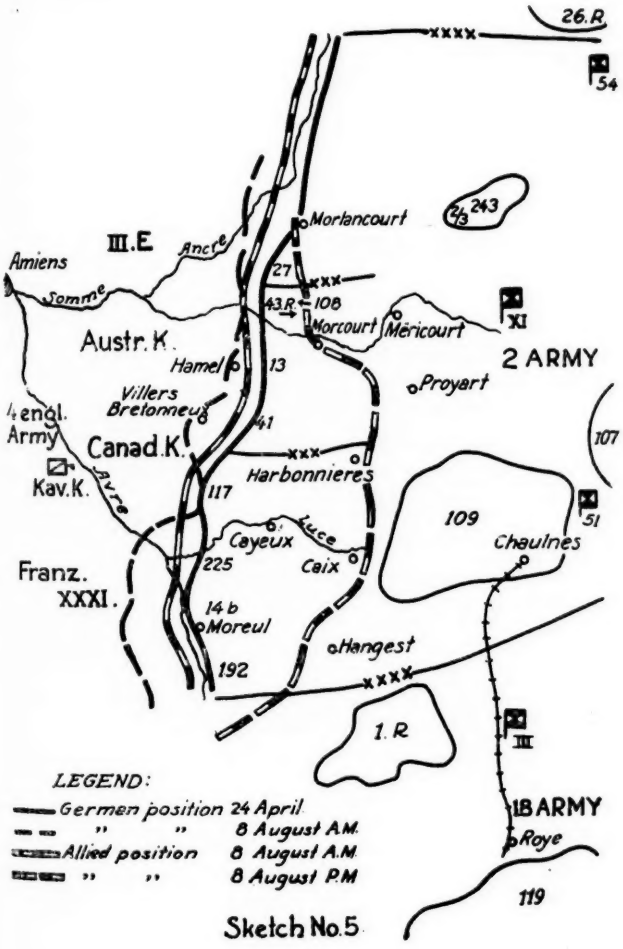
The French offensive had been made possible by the arrival of the American troops, and, above all, by the tank. That the French failed in their objective of eliminating the entire German salient, was no fault of the new instrument of war. It was due to the fact that the tanks had not been properly concentrated for a main effort.

On the German side antitank measures were inadequate. At least six field pieces should have been emplaced immediately behind the main line of resistance in each division. In any case, however, the tanks could not have been stopped; there were too many. But had these measures been taken, the German infantry would never have been blamed for the failure. It would have fought bravely. Unfortunately, the German divisions that had received the brunt of this attack, ceased to exist. Their experiences could not be passed on. And so there still had to be a third big tank battle in which the defender would be as unprepared as he had been in the first two.

The British had repeatedly attacked the position which the Germans had reached in front of Amiens in April, only to be repulsed with heavy losses. (See Sketch No. 5) Now they began making greater efforts to push back the Germans on this front. On 4 July, six Australian battalions, supported by 60 tanks, attacked south of the Somme and captured the village of Hamel and the high ground to the east and south thereof. The infantry and tanks had rehearsed this attack together very carefully behind the front. The attack was launched by surprise in the early dawn as had been done at Cambrai. The British reached their objective everywhere. They took 1,500 German prisoners besides killing or wounding 670 others. The attack convinced the British that they were on the right track, and that the Germans had made no progress in developing an effective antitank defense.

The French attacked the bridgehead at Moreul on 12 and 23 July. The British 9th Tank Battalion gave valuable support during the attack on the 23d. The attacker again took large numbers of prisoners. The Germans had to withdraw behind the Avre.

The results attained by the Entente powers in the fighting about Soissons convinced their commander-in-chief that the



time had come to prepare for a general offensive by a warfare of attrition along the entire front. Naturally, the first attack would be in the region of Amiens where the Entente powers themselves were most threatened.

General Foch ordered the British Fourth Army to attack on 8 August to secure the important road and railroad center of Amiens. The line: Morlancourt—Méricourt—Harbonières—Hangest, was designated as objective. This was later extended to the Chaulnes—Roye railroad. The army had available for the attack the following troops: north of the Somme, the III Corps of three divisions; between the Somme and the Luce, the Australian Corps of four divisions, the Canadian Corps of four divisions, and the Cavalry Corps composed of three cavalry divisions; and south of the Somme the French XXXI Corps of five divisions. The British divisions were supported by 2,068 guns, 360 heavy tanks, 96 new fast Whippet tanks, 16 armored cars, and 408 airplanes. The French Corps had 616 guns, 90 light Renault tanks, and 60 airplanes. Among the British heavy tanks were two battalions of the new *Mark V "Star"* tanks, especially designed for crossing wide trenches.

Every precaution was taken to keep the preparations for the attack secret from the Germans. The Canadian Corps, which was Great Britain's best attack unit, was not to reach its line of departure until just before the attack. Some Canadian battalions and numerous tank units were moved to the Flanders front to give the impression that an attack would be launched there.

The British had observed that the German successes of March and April had been gained by pushing forward where resistance was weak, without regard to neighboring units, and then reducing the strong centers by envelopment. The British now practiced this maneuver with tanks and infantry working together. Furthermore, profiting from their experiences at Cambrai, the British had the divisions making the main attack rehearse the attack with the tanks that were to support them; they moved the cavalry closer to the front before the attack, and attached medium tanks to it; and they provided for the forward displacement of the artillery to begin as soon as the first rolling barrage would be completed.

The British aviation was called upon to fulfill a number of missions. Before the attack it was to be used to drown the noise of the tanks going into assembly positions. During the attack it was to support the infantry with machine guns and bombs, paying particular attention to German antitank guns. As the attack progressed the aviation was to attack any German reserves moving forward. Finally, airplanes were to cooperate

with the tanks in attacking any hostile elements starting a retirement.

The British III Corps, the combat efficiency of whose divisions was low, had only a secondary mission. It was to prevent hostile interference from north of the Somme with the British main attack. The Australian and Canadian Corps, assisted by the Cavalry Corps, were to make the main attack.

Heavy artillery fire was to be put down along the entire front of the British Fourth Army at about 5:20 AM. At the same time the infantry and tanks of the British corps were to move forward. The French XIII Corps did not plan on using its tanks until after the German trench system had been captured on account of their limited terrain-crossing ability. The French infantry, therefore, which had to make its first advance without tanks, was to have the benefit of a 45-minute artillery preparation. Hence its attack would start 45 minutes later than that of the British infantry.

Opposite the British Fourth Army, in order from north to south in the German front line, were: one division of the LIV Corps, the XI Corps with three divisions, and the LI Corps with four divisions. Three divisions in reserve were available on this front, and call could be made on neighboring units for three more reserve divisions. These reserve divisions, however, were exhausted, and besides, two of them had left the bulk of their artillery, and one, most of its machine guns and mortars, in position. Furthermore, some of them were just completing their relief so that on the morning of the attack part of their units were still en route to their rest billets. Of the divisions in line, only two were rated as fully fit for battle.

Then too, the morale of the German soldier was beginning to sink. The German high command had given up its plan for an offensive in Flanders, which allowed doubts to arise over the possibility of a final victory. The tank had become the decisive element in the enemy's attacks. The German soldier had to face the fact that with its aid the enemy had twice made great gains without serious losses and had each time taken a great number of prisoners. An effective defense was no longer possible unless means could be found to destroy this new engine of war, and no such means had been produced. From Berlin too came the disquieting news that the usually docile Reichstag had attacked the high command for having had so few tanks built.

But the value of the German soldier can not be considered by itself; it must be compared with that of the soldiers of our opponents. The British and French soldiers had been brought to the verge of destruction by our attacks in the spring. They were recovering only gradually. Of the sixteen divisions taking part in the attack, only the eight Australian and Canadian divisions could be considered entirely fit for combat. Some of the others had been in line as long as the Germans. But the enemy had this tremendous advantage—they believed that a German attack was no longer possible, and could begin now to plan for a final decisive offensive with confidence. They also had the means at hand with which to make their attacks effective and almost without danger to themselves, a means which the Germans had been unable to check in previous battles.

The German troops in front of Amiens had heard the enemy carrying forward ammunition at various places. They thought also they had heard the noises of tanks, but the higher headquarters ridiculed these reports for they had fallen for the British ruse in Flanders. On 6 August, a German aviator observed about 100 tanks moving towards the front. On 7 August, a chance German shell struck a gasoline tank in an orchard near Villers-Bretonneux and ignited it. Their suspicions aroused by this, the Germans shelled the entire orchard and destroyed 25 tanks with all their equipment. But even this chance discovery did not induce the Germans to take proper countermeasures. They were satisfied with the measures previously taken even though these had proven inadequate against recent attacks.

Some outpost companies had been equipped with two 13-mm antitank rifles. In each division sector from two to four field pieces were assigned to antitank defense. Some of these were held in the vicinity of their batteries where they could be pushed forward promptly into open firing positions; the others were held far to the rear, by platoons, with teams hitched. These so-called antitank guns were certainly too far to the rear to be able to go into action in time to protect the infantry zone.

During the night of 7-8 August, the outposts of the German 27th Division heard tank noises. (See Sketch No. 5) When this report was sent to the rear the artillery put down defensive barrages which were repeated throughout the night. The outposts of the 108th Division discovered British riflemen leaving

their own trenches and digging in behind the German wire entanglements. This report also brought down artillery and trench-mortar fire. About 4:30 AM, the German 41st Division made a raid in the vicinity of Villers-Bretonneux, but found the British forward trench unoccupied. The Canadians at that point had not yet come forward in order to keep from revealing their presence. The outposts of the 225th Division also recognized tank noises, but failed to get the information back to their artillery in time. It was just there that a timely barrage could have caught 28 tanks crossing the Luce on their way forward.

A fog which had descended at midnight became more and more dense toward morning. About 5:20 AM, a hurricane of fire suddenly came down on the entire German front. The hail of shells fell on the German front trenches for a few minutes and then moved on to the east. The German batteries were all taken under fire, even those which had been silent for days, and which it was thought had not been disocvered. In a short time communications were interrupted, and many guns were put out of action.

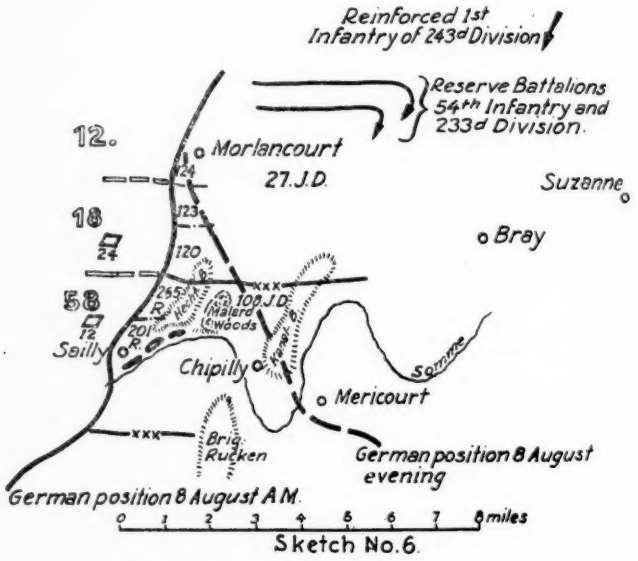
The Attack North of the Somme

(See Sketch No. 6)

The Somme valley is wide and marshy. The villages of Morlancourt and Sailly were immediately behind the German main line of resistance. In the sector of the German 27th Division there was no tank obstacle other than the village of Morlancourt. The sector of the German 108th Division, on the other hand, was almost completely closed off for tanks by the Malard Woods. The Hecht and Kanal hills are the highest ground north of the Somme, and offer good observation to the south of the river. For this reason the possession of these hills was important to the British in order that their main attack south of the Somme might not be interfered with. The British final objective for the day included the Kanal hill, and from there bent back to the south edge of Morlancourt. An intermediate objective, which was to be reached by 7:20 AM, included the Malard Woods.

The British 12th Division was not to attack Morlancourt directly, but was to pass around and isolate it. This division received no allotment of tanks. The 18th and 58th Divisions

were allotted 24 and 12 tanks, respectively. These two divisions assigned the greater part of their tanks to the first wave and the balance to the second. There was no massing of tanks at any point for the attack.



Sketch No. 6.

The German 27th and 108th Divisions held their sectors with regiments abreast. The regiments generally had one battalion on the main line of resistance and the remainder in reserve. The artillery of both divisions was emplaced on the slopes of the Kanal hill.

The visibility, which had been limited to 20 or 30 yards due to fog, was further reduced by smoke shells when the British barrage came down at 5:20 AM. It became impossible to see pyrotechnic signals.

In the German 108th Division, the right regiment met its fate first. Its main line of resistance was penetrated seven minutes after the artillery bombardment began. The British assault troops pushed forward recklessly behind their tanks, leaving the mopping-up to the waves that followed. The German reserves were attacked before they could take up a defensive position. By 6:20 AM the British attacked the last

reserves of the regiment at the northwest corner of the Malard Woods. A short time later the regimental commander sent forward an officer's patrol to find out what was going on: the regiment had disappeared! A few remnants only drifted back later. The main line of resistance of the middle regiment of the division was also overrun rapidly by tanks and infantry, but the tanks were unable to penetrate the Malard Woods. Two tanks attempting to pass around the woods were destroyed with overcharged hand grenades. The British infantry, losing the support of its tanks, did not get possession of the Malard Woods until 8:20 AM.

The British tank attack against the front of the German 27th Division was delayed until about 6:00 AM, probably by the barrages which the German artillery put down during the night. However, within a half-hour after the attack was launched the German front-line infantry had disappeared. By 7:20 AM the British were on their intermediate objective.

These attacks again demonstrated the value of the tank. Only where it was supported by tanks was the British infantry able to make progress.

The German 27th Division had two reserve battalions just to the east of its artillery area, and three more in rest areas farther to the rear. The 108th Division had a reserve battalion east of the Kanal hill and another northeast of Méricourt. These reserves had been alerted at once when the British bombardment commenced. The two battalions of the 27th Division farthest forward were caught in the British barrage and lost heavily. The two reserve battalions of the 108th Division took up a defensive position in front of the division artillery. When the commander of the German LIV Corps became satisfied that the attack did not extend north of Morlancourt, he gathered together all the available division reserves (9½ battalions of infantry and 3½ batteries) and formed a line from the south edge of Morlancourt to the north slope of the Kanal hill where it connected with the two battalions of the 108th Division.

Later in the morning as the fog lifted, the artillery observers on the Kanal hill were able to see, south of the Somme, British columns of infantry moving forward, batteries going into position, and a group of tanks. The guns were at once turned on these objectives. The infantry columns were engaged first and dispersed, then four tanks were destroyed, and finally the batteries were successfully engaged. In spite of this fire from the

north bank, the British attacking south of the Somme made such progress that the left flank of the German 108th Division had to be refused. The division abandoned 7½ batteries in this withdrawal.

The British did not press the attack north of the Somme after arriving at their intermediate objective. In the sector of the German 27th Division part of a British battalion pushed forward to the final objective, but was forced to retire by the German artillery. At the end of the day the final objective had not been attained at any point north of the Somme. Nevertheless the British results here were outstanding. Eight German infantry battalions had been practically wiped out, and 7½ German batteries had been abandoned. The full value of the tank must be estimated by comparing this result with that attained by the German 27th Division on 6 August. We see that British troops, not highly rated, were able to overrun German troops rated as "good." (To be continued)

JOFFRE WAS NO NAPOLEON
A French View of the First Battle of the Marne

["Joffre war kein Napoleon." By Major Moszdorf. *Militär-Wochenblatt*, 18 December 1936.]

Abstracted by Major E.F. Koenig, Infantry

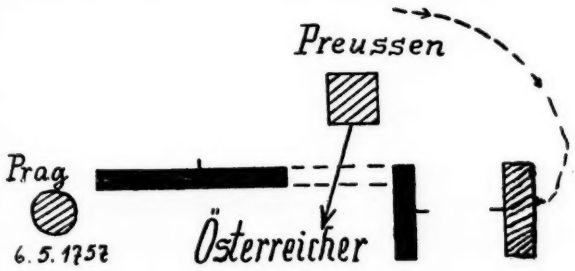
As to the actual course of events on the right flank of the German armies, and on the corresponding left flank of the Allies during the first days of November 1914, there now exists very little controversy. In spite of this the First Battle of the Marne will be used countless times to point out some lesson in military history, some lesson in tactics or strategy. Especially valuable lessons can be drawn from the conduct of higher headquarters, and particularly so if they are compared with similar decisions by great military men in the past. It is quite immaterial how great the gap in time is. Strategic principles do not change even if the forces concerned take up an entirely different appearance, and tactics have changed.

The French general de Cugnac, whose articles have also appeared in *La France militaire*, has viewed this battle from an entirely different angle when he wrote, "Supposing Napoleon had Fought the Battle of the Marne," which was published in the *Revue de Paris*, 15 September 1936. The article follows along the lines indicated above. The author points out that

although the advance of the German armies was halted, the Allies did not win a decisive victory.

Napoleon followed a system which was partially employed by the French in the battle of the Marne. Even as a Second Lieutenant, Napoleon had studied military history and was especially interested in the battles of Frederick the Great. However, the author quiets French susceptibilities by stating that: "A genius may borrow an idea, but he implants upon it his personal seal and gives it definite form." The example that the author wishes particularly to emphasize was based on Frederick the Great's battle of Prague on 6 May 1757.

The Austrians under General Browne were in line. Their left was resting on Prague; they were facing north. Frederick the Great decided to attack the hostile right flank with his left. The enveloping force was commanded by Field Marshal Schwerin. In other words, it was the oblique order that he used at Leuthen. Browne moved his right flank a full ninety

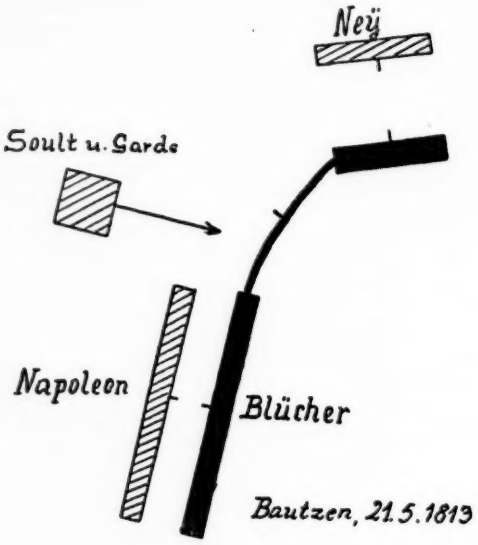


SKETCH NO. 1

degrees in order to meet the envelopment, but his center and left remained stationary. As a result a gap was created between the right flank of the Austrians and their main body. Frederick noticed this and struck it with his main force. He abandoned the oblique order and was satisfied to have Schwerin make a weak flank attack. But Prague was a very unusual situation, because it offered a totally unoccupied gap in the Austrian lines. Careful commanders will see to it that their line will stretch and bend if they plan on moving their flank to meet an envelopment.

Napoleon left no commentaries which would indicate that he took the battle of Prague as a model. But in a number of successful battles we can see the pattern of Prague repeated.

Solferino, Austerlitz, and Wagram can be taken as proofs. General de Cugnac believes that the battle of Bautzen, 21 May 1813, against Blücher, was a particularly classical example. Bautzen does resemble the First Battle of the Marne. It lasted two days. Napoleon commanded 200,000 men in that battle. Blücher was on the right bank of the Spree. Marshal Ney was



SKETCH NO. 2

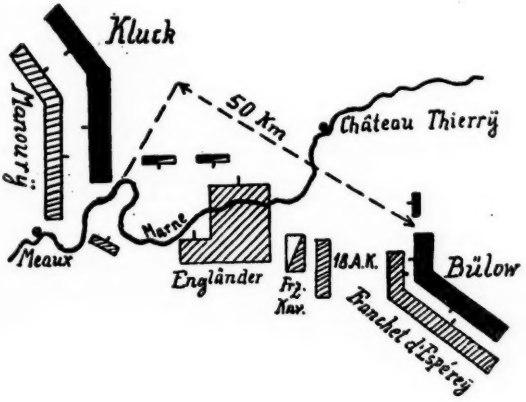
sent from Berlin with three corps to attack Blücher's right flank, and to envelop him. On the first day of the battle Napoleon was content to drive back the Prussian outposts at noon, and at the same time he massed his main forces on his left. Blücher knew about Ney's advance, and watched him with one division. On the 21st Napoleon carried out the Prague maneuver in this battle. Blücher refused his right in order to prevent its being enveloped, and thinned his front to maintain contact between his right and his center. Napoleon therefore saw himself opposite a gap, just as Frederick the Great did at Prague. He ordered the Guard and Soult to attack this thin connecting line and directed Ney to merely contain the enemy while the decision was being fought on the other flank. The French penetration along this "seam" led to the withdrawal of the Prussians and

their allies. This "system" has three phases, according to de Cugnac: (1) Immobilizing the hostile center and one flank by minimum forces; (2) Envelopment of the opposite flank, with the maximum of surprise; (3) A main attack by a previously concentrated mass against the weakened portions of the front, which have acted as liaison between the hostile center and flank.

Now as to the First Battle of the Marne. Two of the conditions enumerated were present on the left flank of the French; only the third factor was missing. The French line from Mülhausen to Melun had stopped withdrawing. The phase where Napoleon immobilized part of the hostile line with a minimum of forces had arrived. The second phase also came, when Manoury's army made its surprise attack against the German right.

The third phase, however, was lacking. It had not been anticipated. Here de Cugnac takes occasion to bemoan the absence of the study of military history by the French army. He goes further and states that if the Napoleonic principles had been known at that time to the French army, the war would have ended on 10 or 16 September 1914.

The reason that it did not happen was because no forces were massed opposite the gap. In fact, there were no forces available, not even reserves. Even worse. The very point where the gap existed was the junction point between the French and British armies. And the British failed.



SKETCH NO. 3

The French imagined that the German armies were advancing in a single line without any reserves to speak of, and that if their flank was threatened the only action they could take would be to realign the flank army to meet this threat. The French should have had a complete army available to throw into the gap. Instead, it was the boundary between French and British, and nothing but Conneau's Cavalry Corps of three divisions was available.

General de Cugnac reproaches von Kluck also for not being familiar with military history. The answer to that of course is that his Chief of Staff, General von Kuhl, had been instructor in military history at the German War College for the past ten years. As a matter of fact there were four cavalry divisions in the gap of 31 miles between the First and Second Armies, at the time when von Kluck turned his army to meet Manoury.

General de Cugnac continues by stating that on 8 September the German cavalry withdrew to the right bank of the Marne without destroying the bridges, and remained content with closing the western half of the gap, leaving a completely undefended stretch of about 18 miles to the east thereof. Two corps would have been sufficient, provided they had been ready on 7 September to advance into the gap on the 8th, without meeting resistance, and would have had the assistance of twelve bridges. On the 9th they could have been in rear of von Kluck, while he was being attacked in front by Manoury.

General de Cugnac then complains of British lack of energy and vacillation while open to such opportunities. The difficulty was, they were not subordinated to the French, and Joffre could advise and suggest, but not command. The British had five divisions and one and one-half cavalry divisions. However, the French themselves did not take advantage of the situation either. When von Kluck shifted the first two corps toward the north, the gap appeared in front of the British, but when he moved the next two corps, the gap was also in front of French troops. The French cavalry corps and their XVIII Corps under General Maud'huy had no enemy on their front. Only the easternmost positions of the French Fifth Army were opposed by the German Second Army. General de Cugnac typifies the British action as an inexcusable mistake; the action of the French as inexplicable failure. The French cavalry corps had been given the mission of maintaining contact between the British Army and the French Fifth Army. They did this, and nothing

more. For that reason de Cugnac criticizes them as well. Their inactivity he considers a grievous error, and he believes that ordinary common sense should have dictated to the cavalry commander that he should have ordered an advance. The main blame, of course, falls on French general headquarters, which did not direct the cavalry to make an advance.

General de Cugnac concludes his study with the remark that the gap appearing between the armies of von Kluck and von Bülow had not been exploited by Joffre in the Napoleonic manner. Instead of concluding in one sudden stroke, the war dragged on for four more years. He leaves it to the reader to conclude the sentence: "Had Napoleon been in command of the Allies during the First Battle of the Marne, then . . ."

The study of this French author must be agreed with. It is true, Joffre was no Napoleon. The *sacre feu* of a great commander was not burning in his breast, but on the other hand he had enough strength of character to order the French withdrawal to be halted and on 4 September had the courage to order an attack. Therein he rose above the level of the German high command, which left the German army commanders to their own resources, and did not even intervene when it had a better picture of the general situation than they did. Joffre also had intelligence enough to realize the advantage which was offered him when the First Army advanced to the southeast, and thereby created the condition which was the basis of the critical Marne situation. This can be clearly seen from the wording of his telegram to the Secretary of War on 5 September, in which he bases his attack decision on the actions of the German First Army. If the First Army had attacked Paris, the Battle of the Marne as we know it now, would not have taken place. By advancing to the southeast, the German Second Army was squeezed towards the east, and the VII Corps was even pinched out of line. Very correctly General von Gronau realized that the only solution to the threat from Paris was an attack in that direction. This, however, created a bad crisis. The First Army was shifted to the Ourcq, and the fatal gap between it and the Second Army was created. The refusal of the German right could have been only executed with safety had reserves been available to send into the inevitable gap. The cavalry divisions that were sent into it failed completely and did not even destroy the bridges over the Marne. The 5th Division of the III Corps was shifted back towards the east too late, on 8 September.

The situation was identical with that of Prague and Bautzen, just as de Cugnac says, and had Joffre been a great commander he would have, and should have, exploited the gap between the First and Second Armies by sending large masses of troops into it. During the course of the battle, Joffre did appreciate the opportunity. We know this from the repeated urgings he addressed to the British Expeditionary Forces to advance into the gap, but unfortunately the British were not subordinated to him. Joffre had committed the additional mistake of leaving too many forces on his right front, where the chain of fortresses gave him ample opportunity to hold the line thinly, and from which an excellent railway net would have facilitated troop movements to the opposite flank. Even though he shifted his forces sooner than his opponent, he did not send them to the decisive left flank, but sent the reinforcements to the Third Army. His solution was by no means a Napoleonic one. We gather this from his General Orders of 4 September, in which he merely directed an attack against the extreme German flank. Such directives went to the Fifth and Sixth Armies, but the newly created Ninth Army of Foch's was merely used to protect the right of the Fifth Army. This indicates that Joffre had never given up the idea of a double envelopment. This is especially evident from his repeated orders to the Third Army to advance in a westerly direction.

The German Official History is of the opinion that after the German IX Corps (von Quast) had won a victory on the morning of 9 September, the battle of the Marne was won, especially after the 5th Division had been thrown into the gap and was able to hold up the slowly advancing enemy. A further advance by the British Expeditionary Forces or the French Fifth Army into the gap would have led to a disaster for these troops, for they would have been attacked on all sides by the victorious German First and Second Armies. At this instant German General Headquarters had to make its fatal interference. The victory, fought for so bitterly, was torn out of German hands. These conclusions, however, are based on suppositions which are difficult to prove, and hardly true. The German victory, as depicted in the Official History, would only have been complete if it had been exploited not only on 9 September but on 10 September as well. Whether it then would have been possible for the First Army to have made a quick about face can not be proven. It would certainly have been

better for the First Army to have made its decision to withdraw not at noon on 9 September, but to have waited at least until dark, to see how the day's battles had resulted. It would be more correct to say that the German right flank was recalled before the decision on the Marne had fallen.

In general, the article of this French general indicates an excellent knowledge of strategy and it presents a new angle of the Battle of the Marne. It again verifies the fact that both sides lacked determined leadership. Joffre was no Napoleon, but neither was there a strategic genius on the German side.

THE OUTBREAK OF THE WORLD WAR IN 1914, UNDER A DIFFERENT WAR PLAN

["Der Kriegsbeginn 1914 unter einer anderen politisch-militärischen Zielsetzung." By General Wetzell. *Militär-Wochenblatt*, 19 February 1937.]

Abstracted by Major E.F. Koenig, Infantry

The great German strategist, General Wetzell, presents an entirely different viewpoint of how the campaign against France could have been planned. The initial raid on Liege in August 1914 has frequently been considered as a model method for a surprise opening of a war. The question has frequently been raised in Germany: Was there no other way?

This early violation of Belgian neutrality had a number of far-reaching effects, more from the political rather than the military standpoint. It provoked the declaration of war by Belgium, Great Britain, France, and Russia. It caused the entry of Great Britain into the war on the side of the Allies, and it placed the onus for having provoked the war on Germany's shoulders, with all the fatal consequences of such a burden.

The Schlieffen plan of 1905 had already provided for a swing through Belgium, but Moltke believed that the only way that he could guarantee the success of this plan was by an early possession of Liege, not only on account of its roads and bridges, but principally to possess the one through railroad crossing over the Meuse. The actual results in the war to a large measure justify this decision. On the other hand, we know that the capture of Liege was mainly a matter of luck

the energy of a single man (Ludendorff), and other breaks in favor of the Germans.

Schlieffen planned to capture Liege after a regular siege, and artillery preparation after the conclusion of the concentration. Was the situation then in 1914 so different from the situation in 1905?

Ludendorff, in his book, *Der Totale Krieg*, justifies the changes made by Moltke in the Schlieffen plan. He warns that the mission in war is not the execution of prepared plans, but the recognition of hostile weaknesses, and their exploitation.

Accordingly, the supreme command must be endowed with flexibility and versatility, even in executing a war plan carefully planned in times of peace. The elder Moltke said: "In war we meet the independent will of the opponent. Our operations do not depend alone on our own intentions, but also on those of the enemy. The first we know, the others we can merely guess at." For that reason he also teaches, "Strategy is nothing but a series of expedients."

Ludendorff had been removed from the war plans division in 1913, and was not at the side of the Chief of Staff in 1914, when the situation brought about by Serbia was an entirely different one than the one contemplated under the war plan.

The Elder Moltke drew up two or even three different war plans during the course of a single year, adapting them to the changing political situation. He had the advantage of having Bismarck at his side as political advisor. This cooperation between Bismarck and Moltke was exemplary. Every war, whether voluntary or forced, had not only a military background, but had been provided for politically. If the latter is missing one of the germs of defeat is already present. Unfortunately, that was the case with Germany in 1914.

The German Chancellor and his foreign minister were not at all informed of the military situation. The first the Chancellor knew of the planned raid on Liege was when the personally drafted ultimatum was presented by Moltke. Neither the Chancellor nor his foreign minister felt themselves competent to argue about the military necessity of this raid, and the ultimatum delivered on 2 August, resulted in its rejection, and the entry of Great Britain into the War.

The demand that the raid, planned for the fourth day of mobilization be executed against Liege as planned, created a very unfavorable political situation for Germany. The British

politicians, even more so the French, and the Russians, all breathed easier. The entente functioned far smoother than their most sanguine adherents had ever hoped.

Was this unfortunate situation, caused by the raid on Liege, necessary from a military standpoint? A number of experts have officially declared that the Chancellor should have refused his consent to such an operation, and there is ample evidence that the military were to some extent prepared for such a refusal. Both General Waldersee and General von Seeckt have stated that this was discussed and that general headquarters would have had to find another solution to the problem.

Aside from all this, did the situation in 1914, from the purely military viewpoint, not justify a delayed declaration of war?

If there would have been a delay of from eight to ten days in the intervention of Great Britain that alone would have been worth-while. It must not be forgotten that it was the B.E.F. which at Mons prevented a decisive defeat of the French north flank of their Fifth Army.

All the more important were the changes which had been taking place on the French side. The far-seeing elder Moltke had already recognized that for no other than sentimental reasons any opening move of the French would have to be a reconquering of Alsace-Lorraine.

On the other hand, Count Schlieffen was correct in his plan of *1905* when he assumed that the French would assume the defensive. As a result of the Russo-Japanese War the Russian ally had been neutralized for the next five years.

But the situation in 1914 was an entirely different one. Ever since 1909 things had begun to change. The Russian army had been strengthened year after year, and the French also had been making superhuman efforts to bring their army to a par with the German army in numbers, equipment and training. The alliance between these two countries was based on an attack, and in France, following the Napoleonic tradition, the idea of the offensive was nursed in the schools of Foch, Bonnal, and Grandmaison. It was personified in Joffre, the commander-in-chief of the army since 1911.

Moltke and his assistant (until 1913) Ludendorff, quite correctly assumed that the French would attack, and primarily with overwhelming forces in Alsace-Lorraine. This conception was at the bottom of the changes made in the Schlieffen plan

(which have been criticized so freely of late), but which Ludendorff considers as fully justified.

Did this new war plan call for the raid on Liege? In view of the unexpected turn of events, would not some other opening move have suited the plans of the Central Powers better?

For one thing, the Central Powers were not faced with the expected two-front war, but they had a three-front war (Russia, France, Serbia) to contend with. The main burden in the east and the Balkans lay upon the shoulders of Germany's ally—Austria-Hungary—whose military shortcomings were well known to the Germans. In view of the unalterable requirement that she commit two armies against Serbia, the task confronting Austria was well beyond her powers. Would Austria be able to keep the Russian giant off the German necks until they would be able to gain a decision against France? That was a very serious question, for the strategic wide envelopment on the Western Front could not be exactly predicted as to the time element. Moltke figured that after 40 days, with lucky breaks, it might be possible to ship troops from the Western Front. In addition the early entrance of Belgium and Great Britain would add to the complications resulting from any British expeditionary force that might be in France, and as actually occurred.

The determining factor on the Western Front was the attitude of the enemy. If the French would advance with superior forces in Alsace-Lorraine, an operation, which in view of the fortifications of Metz and Strassburg was only possible with very powerful forces, unless the French were willing to risk defeat at the outset; then the question arose, what would the French main forces be doing? If the French forces concentrated behind Luxemburg and the Meuse remained inactive, then the attacking units in Alsace-Lorraine were subject to defeat in detail by superior German forces—an operation which Moltke had already planned for. Such an attitude of the French main forces was hardly to be expected. Not only by reason of the offensive Franco-Russian treaty, but also on account of the very development along offensive lines, which we have previously described, it became inevitable that the French main attack would be made between the Moselle and the Meuse in the direction of Coblentz—Cologne. As to whether additional Anglo-French forces would advance west of the Meuse could not be predicted, but was a decided possibility.

Along this broad attacking front of the French armies, the fortress group of Metz-Thionville acted as a breakwater which created a gap of about 36 miles and divided them into two principal halves. The decision could therefore fall quickly on either or both of these theaters of operations, provided that the Germans would have adopted their operations plan to the action of the enemy.

Such a basic idea was at the bottom of the Moltke plan of 1914, but in addition it contained the principle of a wide envelopment through Belgium. In other words, the plan was a compromise between the original Schlieffen plan and Moltke's own plan. Moltke wanted to drive the entire French army against the Swiss frontier, and envelop it wherever it made its stand. He figured that the French would make a decisive stand, while the Germans were advancing on Paris. In Schlieffen's day there was no other solution possible. But in 1914 the cooperation of the French, by advancing themselves, offered the opportunities for a much simpler, politically much less dangerous solution, in which to some extent one gave the French the initiative. This provided that one should abandon any plans for a raid on Liege, and would permit the concentration to conclude as planned. This was to take 14 days, and in the actual situation, the fourteenth day was the decisive day on which the enemy situation was clearly established. In other words, one returned to a large extent to the original Schlieffen plan. According to this plan as well, Liege had to be captured early, but while this was going on the center of gravity of operations was shifted to the two other theaters of operations: east of the Meuse, and in Alsace-Lorraine. In view of the fact that both armies advanced towards each other, the decision would be expected early in the campaign.

The envelopment fanatics will of course not agree with such an idea. In reply to them, General Wetzell states that even von Schlieffen acted similarly in a war game in which it was assumed that the French would adopt the offensive initially. It is also interesting to note that in one of the last general staff rides before the war, conducted by Moltke, and in which a French offensive was assumed, the operations were similarly conducted. It is therefore to be regretted all the more that Moltke did not completely rid himself of Schlieffen's heritage and follow the footsteps of his uncle, who always sought the solution in the simplest possible way. This solution always consisted in forcing

the enemy to give battle, and then, under favorable circumstances, to decisively defeat him. We also take issue with the dogmatic statement that the only possible way that a decision could have been gained against France would have been by driving the entire French army against the Swiss border. In the author's opinion an annihilating victory in Lorraine, which was well within the realms of possibility, and its exploitation, would have been adequate, for the French had committed here half of their regular army. Decisions in war can be achieved by partial victories, as we can learn from Napoleonic history. Leipzig was built on several, the victory in 1870 was built on Sedan and Metz; similarly the victories of Tannenberg and the Masurian Lakes were the foundations on which the defeat of the Russians was effected.

If the German concentration would have been permitted to be completed as planned, without the raid on Liege, then the onus of violating Belgian neutrality would have been placed upon French shoulders. The British would have been deprived of their cause for war, and the B.E.F. would in all probability not have arrived in time for a decisive influence on the outcome of the campaign.

The French mobilization was completed two days sooner than the German, due to shorter distances to be travelled. Threatened by the German concentration which extended beyond Aix la Chapelle they would have been forced to act. In 1912, Poincaré had already stated that the existence of such a concentration would have been ample justification for an advance into Belgium, and Joffre's war plan called for such an invasion.

The author concludes with the statement that, with the advance into Lorraine in the middle of August, which could not have been postponed any further because of the Russian treaty of alliance and agreement to a mutual offensive, the entry of French troops into Belgium between the Meuse and the Moselle, became inevitable.

General Wetzell then draws up the orders he would have issued for the concentration of the German armies. He prevents a crossing of the Belgian frontier up to the night of the fifteenth day of mobilization, when the First and Second Armies, equipped with the heaviest of siege guns, began their advance. The Second Army was to cross the frontier on M plus 16, and the Third, Fourth, and Fifth Armies not until M plus 20. The

Sixth and Seventh Armies were to let the French advance up to the Strassburg-Metz railroad. The Fifth Army was to place three and one-half corps available as general headquarters reserves on M plus 18.

The author figures that by M plus 20 a decision would be imminent both in Lorraine as well as on the general line: Namur —Longwy. The First Army had a relatively simple task, as after crossing the Meuse it would be opposed only by French Reserve units.

Taking into consideration the superiority of the Germans in training, especially in rifle marksmanship and superiority in heavy artillery, they could easily have won in these two secondary theaters of operations, and should have been able to achieve a "Cannae" in each. The First Army then would be given the mission of pursuit.

As a whole, the author believes that, if at the outbreak of war, the suggested solution would have been adopted, it would have been simpler, effective, and certainly from the political standpoint, a more favorable situation than the one which was actually executed. Before the end of August the Germans then would probably have been able to send at least twelve corps to the Russian front.

Moltke had changed the war plan to suit the changed situation since 1905 (Liege—Lorraine). But in spite of the again altered situation (Serbia—England—Belgium) he stubbornly persisted in his original idea of an envelopment through Belgium and via Paris, and did not make use of the French cooperation by their advance towards the Germans, in order to achieve an early decision on the Western Front. That should have been sought in the summer of 1914 in eastern Belgium and in Lorraine, and not in front of Paris.

Let us learn that "strategy is a system of expedients," and that operations depend not only on our own desires, but upon the actions of the enemy as well. To adapt one's self to these, to create and discover hostile weaknesses, and then to exploit them by annihilating blows, is the height of the military art.

The events of 1914 prove that a war should never find either soldier or statesman unprepared. This calls for cooperation and teamwork by both sides, and the flexible use of the situation as it actually exists at the outbreak of war. This was not the case in Germany in 1914. Furthermore, it must be emphasized

that the designation of the strategic objective is the function of the statesman, who must bear full responsibility for this selection. Statesman and soldier must supplement each other.

THE BATAISK-MANYCH CAMPAIGN OF THE FIRST CAVALRY ARMY IN 1920

[An article by C.A. Zotov, in the Russian magazine, *Krasnaya Konnitsa*, May 1935.]

Abstracted by Lieutenant Colonel L.K. Underhill,
Judge Advocate General's Department

By 8 January 1920 the Don'Kuban and Volunteer (White) Armies had been beaten, though not decisively, by the First Cavalry (Red) Army; had lost the ports of Rostov and Taganrog and their capital, Novo-Cherkassk, and a considerable quantity of matériel and personnel; had been driven across the Don to the south bank; and had succeeded in destroying all bridges except the railroad bridge.

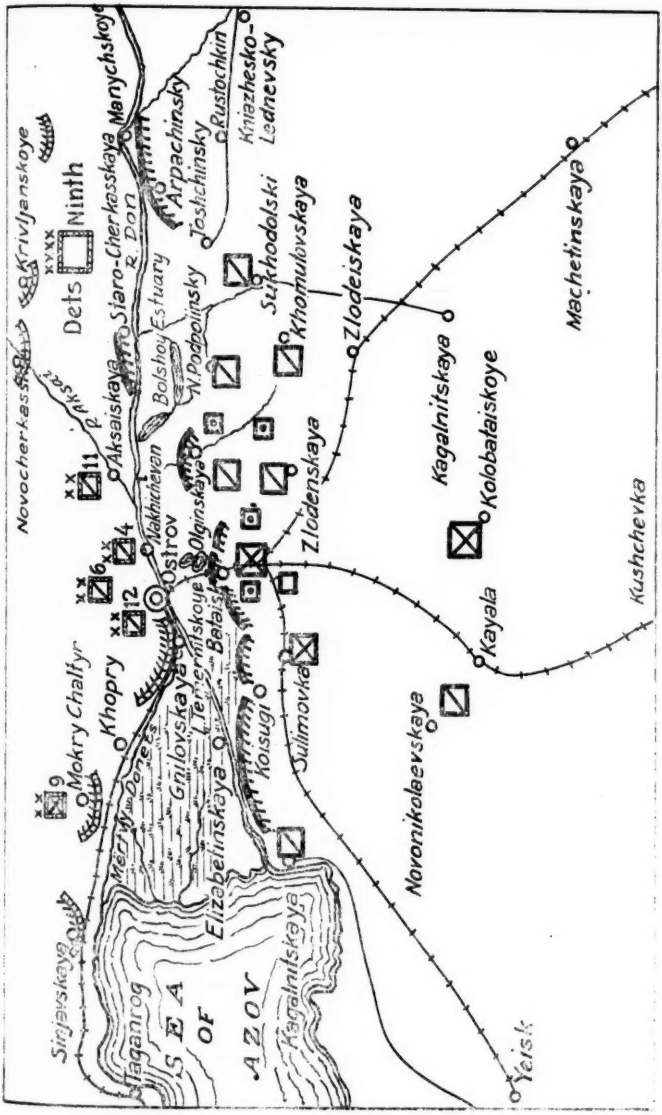
They were entrenched on a 40-kilometer front between Bataisk and Manychskaya, and consisted of 11 infantry and 13 cavalry divisions; in all, 21,700 bayonets, 25,250 sabers, 320 guns, 90,500 (sic) machine guns, 27 airplanes, and 6 armored trains.

The topography favored the White Armies since the swamps of the Don Valley were frozen into an ice field, which a horseman could cross only with difficulty.

The mission of the Red forces (the Caucasus Army Group, commanded by Shorin), was to force a passage of the Don, to invade the North Caucasus, which was Denikin's economic and political base, and drive the Whites from the region. At this time the First Cavalry Army was concentrated at Rostov and Nakhichevan; the Eighth and Ninth Armies occupied the front from Rostov to Krivlianskoe. The First and Eighth Armies were given the mission of attacking the line: Bataisk-Olginskaya from the region of Rostov and of reaching the line: Yeisk—Kushchevka.

Shorin did not know how to utilize large masses of cavalry and employed the First Cavalry Army as he did his other armies, thereby almost destroying its combat efficiency.

On 17 January, when the offensive commenced, the divisions of the Cavalry Army were concentrated as follows: the



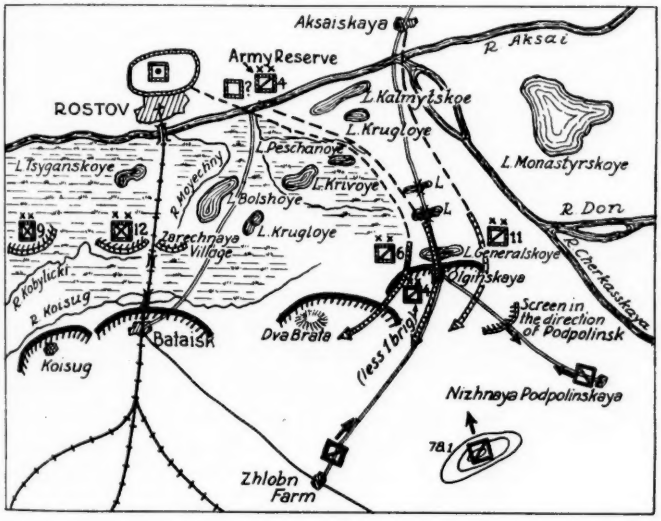
SKETCH No. 1
Situation under which the First Cavalry Army attacked Bataisk

4th Cavalry Division at Nakhichevan, the 6th at Rostov, the 11th at Aksaiskaya; detachments of the 9th Infantry Division at Siniavskaya and Gnilovskaya, parts of the 12th Infantry Division at Rostov, the remainder of the Eighth Army at Rostov, Nakhichevan and Aksaiskaya. The Whites at this time were concentrated on the front: Azov—Bataisk—Olginskaya, and consisted of the I Infantry Corps (five infantry divisions), the II, III and IV Don Cavalry Corps, the II, III, and V Kuban Cavalry Corps, and six armored trains. In all, the Whites had on the front: Azov—Olginskaya, 12,720 sabers, 11,100 bayonets, 454 machine guns, and 120 guns of various calibers; the remainder of their forces were in reserve at the villages of Kayala, Stepnaya and Kagalnitskaya. In strength the IV Don Corps (the 4th, 9th and 10th Cossack Cavalry Divisions) was about equal to the Red Cavalry Army.

Budënny, the commander of the First Cavalry Army, decided to contain the enemy in the vicinity of Bataisk, to attack from the vicinity of Nakhichevan, seizing Olginskaya, and thence to develop his attack on Bataisk and Kushchevka. He ordered the 4th Cavalry Division (less the 1st Brigade in army reserve at Nakhichevan) to cross the Don near Nakhichevan and to seize Olginskaya; the 6th to follow the 4th, to exploit the latter's success, and to attack the enemy in flank in the Bataisk area; the 11th to cross the Don near Aksaiskaya and to attack in flank the enemy in the Olginskaya area; the 12th and 9th Infantry Divisions to attack Bataisk from the vicinity of Rostov. According to the directive of the Army Group Commander, portions of the Eighth Army were to attack Bataisk in conjunction with the First Cavalry Army, but actually they took no part in the action. The Cavalry Army crossed the Don, without artillery (which the ice would not support), and from nine o'clock until dark attacked Olginskaya. The Whites counterattacked with superior forces, and the Reds were forced back across the Don.

On the morning of 18 January, the White armies brought up their reserves. The First Cavalry Army, together with parts of the Eighth Army, renewed the attack; the 4th Cavalry Division crossed the Don at Nakhichevan, followed by the 16th Infantry Division, with the mission of seizing Olginskaya; the 6th Cavalry Division followed, with the mission of exploiting the success of the 4th and 16th and of attacking Bataisk. The 11th Cavalry Division and the 33d Infantry Division crossed

at Aksaiskaya with the missions, respectively, of attacking the army at Olginskaya in flank, and of attacking the farm Nizhny Podpolinsky, and protecting the left flank of the army. The 9th and 12th Infantry Divisions attacked from the region of Gnilovskaya and from Rostov respectively with the mission of seizing Bataisk. Artillery of portions of the Cavalry and Eighth Armies was emplaced on the right bank of the Don and was ordered to fire on Bataisk and Olginskaya.



SKETCH NO. 2
Disposition of the First Cavalry Army on 17 January 1920

Units of the Cavalry Army crossing the Don before dawn captured Olginskaya about noon, but attempts to continue the attack to the south against superior forces were unsuccessful. The 9th and 12th Infantry Divisions were unable to capture Bataisk; leaving a strong outpost on that side, their main forces withdrew to the right bank of the Don.

At dawn 19 January the Cavalry Army renewed the attack, the 6th Cavalry Division capturing Nizhny Podpolinsky but was unable to advance farther to the south. On the night of the 19th, the 4th and 11th Cavalry Divisions were in position at Olginskaya; the 6th was at Nizhny Podpolinsky, the 16th and

33d Infantry Divisions were at Olginskaya, the 9th and 12th remained on the bare ice three versts north of Bataisk.

The attack on Olginskaya had advanced along a single dike because of the conditions of the surrounding ice. The infantry attack on Bataisk was made on the bare ice without cover; the enemy fire pinned the troops to the ice, which was covered with water. The cavalry attacking frontally and without freedom of maneuver was unsuccessful. Nevertheless the group commander stubbornly persisted in the attempt.

The Whites attacked with superior forces from Bataisk and Khomutovskaya and drove the Red forces at Olginskaya back across the Don.

After these unsuccessful operations the RVS (Revolutionary Military Council) of the First Cavalry Army reported to Shorin that a frontal attack on Bataisk was impossible, and proposed that the Eighth and Ninth Armies hold the front from the mouth of the Don to Bogayevskaya, and that the First Cavalry Army force the Don in the vicinity of Konstantinovskaya, and attack with the object of annihilating the enemy, striking him in flank and rear in the direction of Tikhoretskaya. Shorin, however, ordered the First Cavalry Army at all hazards to seize Bataisk and reach the line: Yeisk—Kushchevka. At dawn, 21 January, the Cavalry Army attacked the line: Bataisk—Olginskaya, and after a stubborn fight captured the latter place. On 22 January the enemy attacked with superior forces from the Bataisk—Khomutovskaya—Nizhny Podpolinsky area and drove the Red forces across the Don. This ended the efforts of the Red Army to capture Bataisk by frontal attack.

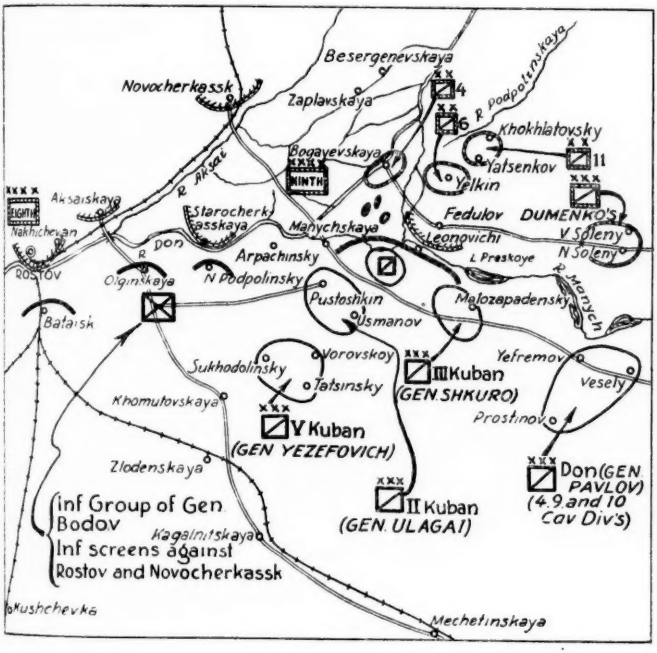
The causes of the failure of the Reds at Bataisk were: the absence of save crossings over the Don; the level, swampy terrain flooded with water; the great numerical superiority of the enemy; and his dominating positions. The Cavalry Army attacked without artillery, and lacked freedom of maneuver. The Group Commander made incorrect use of the Cavalry Army in requiring it to make frontal attacks and to maneuver in sight of the enemy. The Cavalry Army suffered its heaviest losses before Bataisk.

The RVS of the Cavalry Army was with the troops throughout the action. Voroshilov barely escaped capture by the enemy.

The Cavalry Army was not demoralized. In the action at Bataisk it captured 7 guns, 27 machine guns, more than 1,000

horses, and 500 prisoners; 1,500 enemy dead remained on the field of battle.

The Group Commander, now convinced of his mistake, ordered the Eighth and Ninth Armies to hold the front along the Don from its mouth to Novocherkassk, the Tenth to continue the attack on the Velikokniazheskaya area, and the First Cavalry Army to move on 25 January to the Besergenievskaya—Zaplavskaya area, with the mission of striking the enemy at Bataisk in flank and rear and reaching the line: Yeisk—Kushchevka.



SKETCH No. 3
Situation on the morning of 28 January 1920

By the morning of 28 January the 4th Cavalry Division was concentrated at Bogayevskaya, the 6th at Yelkin, the 11th at Kokhlatovsky; the Army Headquarters was at Bogayevskaya. Parts of the Ninth Army held the front in this area. The divisions reconnoitered the Manych River with a view to

forcing a crossing. The plan of attack of the First Cavalry Army contemplated striking a blow from the Kniazhesko—Leonovsky—Malo-Zapadensky area in the direction of Khomutovskaya. The date for the attack was designated as 28 January.

The enemy had learned of the concentration of the Cavalry Army. Furthermore, the 1st Brigade of the 6th Cavalry Division, which was advancing to reconnoiter the Manych and to seize a line of departure for the Division, was erroneously informed by units of the Ninth Army that the Red infantry held the left flank of the Manych. The brigade commander, Kniga, crossed the Manych on a motorcycle without any guard or reconnaissance and fell into the hands of the Whites. A copy of the order for the attack was on his person and fell into their hands.

Kniga informed the Whites that Budënny had 50,000 sabers, 40 machine guns per regiment and 24 guns of all calibers, and that Dumenko was in the vicinity of Vesely with more than 25,000 sabers. He advised the Whites to retire to escape being squeezed between Budënny and Dumenko. His object was to frighten them into an error, but he only succeeded in disclosing the Red plan of action.

Denikin immediately concentrated his forces in the Kniazhesko—Leonovsky, Malo-Zapadensky and Vesely areas. The infantry groups of General Bodov, the II, III and IV Don Cavalry Corps, and the II, III and V Kuban Corps, which had previously fought against the Cavalry Army on the Bataisk—Olginskaya front, were not moved to meet it on the Manych.

Budënny's order directed the 6th and 11th Cavalry Divisions to cross the Manych at dawn in the area: Malo-Zapadensky—Kniazhesko—Leonovsky, and attack to defeat the enemy and capture Khomutovskaya. The 4th Cavalry Division was to follow the 11th and exploit its success. The First Cavalry Army succeeded in driving the enemy from the line of the Manych and in capturing Malo-Zapadensky and in developing its success toward the southwest. The enemy, however, counterattacked the 6th and 11th Cavalry Divisions from the area: Manychskaya—Pustochkin, with the object of cutting off the Cavalry Army from the Manych and from Kniazhesko—Leonovsky and Malo-Zapadensky.

The Army commander immediately directed the 4th Cavalry Division to face to the north and strike the enemy. The

4th Cavalry Division cut the enemy columns between Kniazhesko—Leonovsky and Manychskaya and destroyed one division of the II Don Cavalry Corps. The enemy lost 1,000 dead, 1,500 prisoners, and all his matériel. The 4th Cavalry Division pursued the enemy in the direction of Olginskaya, while the 6th captured Pozdeyev. By dark the 4th Cavalry Division was at Kniazhesko—Leonovsky, the 11th at Malo-Zapadensky, and the 6th at Pozdeyev. Dumenko's Corps tried to seize Veseley but was thrown back across the Manych by the IV Don Corps. Thus the First Cavalry Army was threatened on the left flank.

On 29 January Budënny decided to strike the IV Corps of the enemy at Vesely. On the 28th and 29th the units of the Eighth and Ninth Armies took no part in the operations. The enemy, observing that the Red forces were inactive on the line: Bataisk—Olginskaya—Novocherkassk, moved his reserves from the vicinity of Bataisk to the Manych. On the 29th the Cavalry Army fought continuously on the left bank of the Manych. On the 30th the enemy struck the First Cavalry Army with all his forces, and the Red forces were compelled to withdraw to the right bank of the Manych; the 4th Cavalry Division at Bogayevskaya, the 6th in the area: Fedulov—Yelkin, and the 11th at Khokhlatovsky. Dumenko's corps captured the Soleny farms.

The enemy, concentrated near the mouth of the Manych, decided to attack Bogayevskaya with six cavalry corps and one infantry division, to drive the Cavalry Army to the north, and to move via Novocherkassk on Rostov; simultaneously to attack Rostov with the Volunteer Army from Bataisk. Thus the object of the enemy included surrounding and annihilating the Eighth and Ninth Armies. Shorin, informed of the situation from a report of the RVS of the First Cavalry Army, attached Dumenko's corps to the Cavalry Army, and ordered the Army again to strike the flank and rear of the enemy at Bataisk and reach the line: Yeisk—Kushchevka. Evidently he did not understand that the Bataisk Group of the enemy was now facing the Cavalry Army on the front: Vesely—Pustochkin—Manychskaya.

Accordingly the RVS of the Cavalry Army ordered the Cavalry Army to cross the Manych and seize Pozdeyev, and Dumenko's corps to seize Vesely and continue the attack toward Khomutovskaya and Kushchevka.

On 1 February the 4th and 6th Cavalry Divisions moved against Pozdeyev, the 11th followed the 6th in army reserve, prepared to ward off a counterattack of the enemy in the direction of Manychskaya. Before dawn, the 4th Cavalry Division seized the crossings and Malo-Zapadensky. By 7:00 AM all divisions were on the left bank of the Manych. By noon the 6th Cavalry Division occupied Pozdeyev. On 1 February Dumenko's corps was inactive and failed to attack Vesely. The Cavalry Army was unable to advance beyond Pozdeyev.

At dawn, 2 February, the Cavalry Army resumed the attack; Dumenko also attacked Vesely. The Eighth and Ninth Armies remained on the right bank of the Don and Manych. As the Cavalry Army advanced to the southwest, the enemy attacked with a force three times as great; nevertheless the 6th Cavalry Division captured Protsinov by 2:00 PM, and the 4th and 11th reached the area: Malo-Zapadensky and Kniazhesko-Leonovsky. The enemy, however, with the IV Cavalry Corps from the vicinity of Vesely, drove Dumenko's corps back in the direction of V. and N. Soleny; Dumenko lost almost all his artillery. From the vicinity of Manychskaya and Pustoshkin the enemy struck the 4th and 11th Cavalry Divisions with all his forces, driving them across the Manych with the loss of some of their guns. At the same time the 6th Cavalry Division captured Protsinov. Hearing the artillery cannonade in the Malo-Zapadensky—Kniazhesko-Leonovsky area, the division commander surmised that the enemy was attacking the 4th and 11th Divisions; he opened fire with his artillery and immediately changed direction and attacked the enemy's rear. Thus while the enemy was pursuing the 4th and 11th Cavalry Divisions to the right bank of the Manych, the 6th Cavalry Division was driving the enemy to the right bank. The enemy lost 2,000 prisoners, 2,000 dead, and about 100 guns. On the morning of 3 February the 4th and 11th Divisions recovered the guns which they had left on the left bank of the Manych.

The battle of 2 February was only a partial success, as a strong attack by the enemy at nightfall drove the Reds to the right bank of the Manych. At 10:00 PM, 2 February, the RVS of the Cavalry Army sent the following telegram to the RVS of the Republic and the Commander-in-Chief:

> "Since 12 January, by the final directives of the commander of the Caucasus Army Group, the Cavalry Army

has been thrown into combat alone and without a general attack by all the armies. In stubborn battles between 12 January and 2 February the Cavalry Army lost 3,000 men and animals. Urgent measures to strengthen the infantry units in the Azov-Manychskaya sector and immediate transition to an offensive on the whole front are necessary. The Red cavalry is shedding its blood in unequal battles. Its strength has been reduced by half and it is being rendered completely ineffective. Only immediate measures can save the situation. All my representations to the Group commander have been without result. I await emergency orders."

The telegram was signed by Budënny, Voroshilov, and Izoshchenko.

On the same evening, Budënny and Voroshilov reported by wire to the commander-in-chief in substance as follows: that in consequence of the mission assigned the Eighth and Ninth Armies of reconnaissance and passive defense, the enemy was enabled to throw all his cavalry against the Red cavalry; that in the operations of 1 and 2 February, the Eighth and Ninth Armies took no part, and the enemy was given full freedom to maneuver his forces and to mass them where needed; that the Red cavalry was left isolated under very hazardous conditions; that the Army Group commander was criminally negligent in placing the cavalry in a helpless situation; that due to the negligent attitude of the Eighth and Ninth Armies, the enemy, with 1,500 sabers, was permitted to capture Krassnoyarsky, 12 versts from Novocherkassk, and to remain there, making it possible for the enemy to seize Novocherkassk on 3 February; that the Ninth Army commander was now asking the cavalry to drive the enemy from that place; that apart from the fatigue of men and horses, it was impossible for cavalry, particularly acking shoes, to operate in this region of lakes and streams covered with ice.

As a result of these communications, Shorin was relieved and Tukhachevsky was assigned in his place.

By midnight 2-3 February the Cavalry Army was concentrated in the area: Bogayevskaya—Fedulov—Yelkin—Khokhlatovsky. This terminated the Manychskaya operations. Tukhachevsky adopted the plan which had been repeatedly proposed by the commander of the Cavalry Army. The object of this

plan was to annihilate the White armies by striking a blow with the main forces of the Army Group from the Platovskaya—Velikokniazheskaya area against the Don and Kuban Armies, in the general direction of Tikhoretskaya. The new direction of the operations would bring the Red forces on the flank and rear of the enemy concentrated in the area: Vesely—Manychskaya—Khomutovskaia—Bataisk. The Eighth and Ninth Armies, in present positions, were to occupy the line of the right bank of the Don and Manych as far as Vesely. The Tenth Army was to continue the attack on Velikokniazheskaya and Togovaya. Dumenko's corps, from the vicinity of Soleny, was to organize a raid against the enemy's rear. The First Cavalry Army was to concentrate by 14 February in the area: Platovskaya—Shara—Bulutsky—Gremichy Kolodez; on 16 February it was to seize Velikokniazheskaya, and by 21 February, cutting through the Don and Kuban Armies, it was to seize Tikhoretskaya.

The Cavalry Army brilliantly fulfilled this mission, and by 1 March it had defeated the enemy's principal shock group, his cavalry mass, at Yegorlykskaya.

This blow was fatal for Denikin. His forces disintegrated.

AUTUMN MANEUVERS OF THE MILITARY DISTRICT OF WHITE RUSSIA

["Herbstmanöver des Militärbezirks Weiszruszland." *Militär-Wochenblatt*, 11 December 1936.]

Abstracted by Major E.F. Koenig, Infantry

During the autumn of 1936 a large number of maneuvers took place in Russia. Those taking place in White Russia, however, were of particular importance because the mass of the Russian army was concentrated there. They took place 8-11 September.

The maneuver terrain was 12 to 18 miles southwest of Minsk, near the Polish border. It is a heavily wooded terrain, crossed by many swampy streams. Heavy rains prior to the beginning of the maneuver had increased the terrain and road difficulties, especially for the motorized and mechanized elements.

General Uborewitsch was in charge of the maneuvers. He is considered one of the most capable of the present Russian commanders, and had begun his carrer as a Czarist officer.

Five infantry divisions, three cavalry divisions, and large mechanized and aviation forces participated in the maneuver. These troops were divided as follows:

Blue (East), commanded by General Kowtjuch: 3 divisions (2d, 5th and 81st), and the 6th Cavalry Division

Red (West), commanded by General Apanassenko: 2 divisions (4th and 37th), and the 4th and 7th Cavalry Divisions.

Tanks and aviation in force on both sides.

The maneuver began on 8 September under a pouring rain, and lasted for four days without interruption.

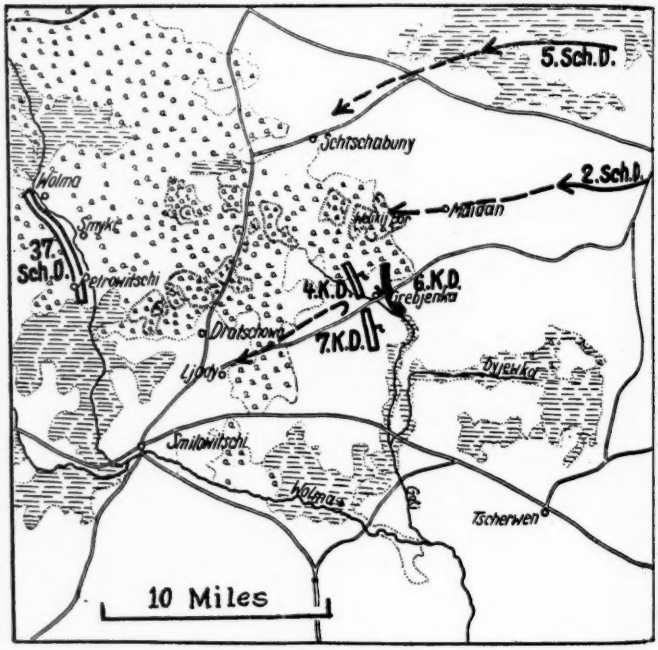
First Day—8 September 1936

Blue was advancing with three divisions from east to west in the direction of Minsk. Two divisions were in front, the 5th and 2d. The 81st Division was echeloned in rear. The 6th Cavalry Division, reinforced with tanks, and the mechanized forces were far in advance of the infantry. The cavalry division had sent out security detachments to front and rear.

Red was protecting Minsk. The 37th Division was defending the west bank of a small stream called the Wolma, covering a front of 8,000 to 9,000 yards. In addition they had advanced the 7th Cavalry Division, reinforced by tanks and strong mechanized forces, to meet the enemy and delay him.

Combat was begun by the reconnaissance detachments of both sides, consisting of cavalry and mechanized units. These met around noon. Shortly thereafter the two cavalry divisions met near the village of Grebjenka. This developed into a large scale meeting engagement, leading to the employment of the main forces, the artillery, and the tanks. On the Red side the 4th Cavalry Division arrived as reinforcements, which, supported by tanks, joined the battle promptly. Blue also committed additional mobile forces to support its cavalry division. The use of motorized infantry and modern tanks on the part of Blue gradually gave them superiority in spite of the fact that Red used three squadrons of attack planes to support their cavalry. Red decided to break off the engagements and to withdraw behind the Wolma River. Even before dark

they prepared for this by committing attack aviation, tanks, and by the use of smoke. The withdrawal was executed during



SKETCH NO. 1
General Situation and First Day of Maneuver

the night. Blue, as soon as the withdrawal of the Red cavalry was verified, continued its advance, and during the night pushes its lines some 24 to 30 miles forward, up to the Red position on the Wolma.

SECOND DAY—9 SEPTEMBER 1936

Blue reconnaissance determined the fact that Red was in position on the far bank of the river. The Blue battalions, however, continued to advance and made energetic thrusts across the river in order to determine whether or not they were opposed by a strong defensive position, or only weak delaying forces. The Blue battalions also had the intention of creating bridgehead to facilitate the development of the remainder of their divisions on the far banks of the Wolma.

Red, however, was able to not only hold its position, but to drive the Blue forces back across the river by means of counterattacks, and the Red cavalry was even able to maintain bridgeheads on the east bank of the river, to the south of the sector held by the 37th Division.

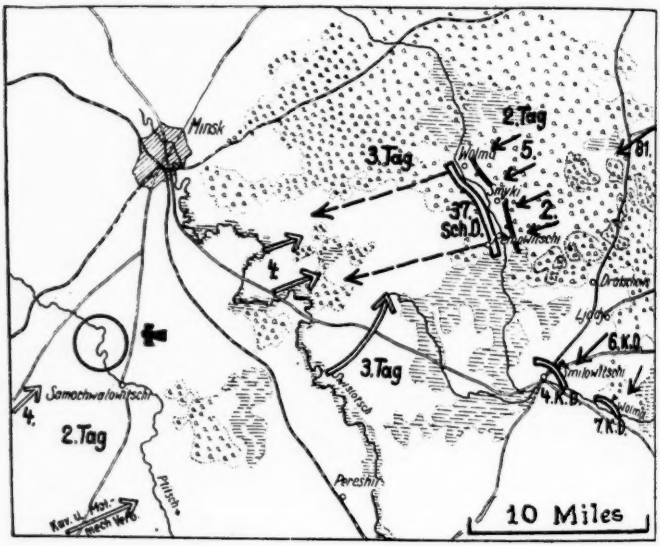
The 37th Division had organized its position with great skill. They did not occupy their main line of resistance along the river bank, but well away from it. Along the bank they had constructed a very extensive outpost line of resistance, strongly garrisoned with automatic weapons, and purposely so designed as to be taken for the main line of resistance. Trenches, often connected, wire, tank traps, and fake positions were to give the impression to the enemy that it was a formidable position.

As Red had hoped, Blue was deceived, and decided to develop for the attack on the following day.

Aerial reconnaissance informed Blue that Red was about to receive some reinforcements, the 4th Division, which was still some 25 miles east of Minsk and advancing in a northeasterly direction. Blue decided to delay these forces and to keep them out of the battle, which in the meantime was to be fought to a decision along the Wolma.

The aerial infantry under Brigadier General Karmeljuk was given the mission of preventing the intervention of the 4th Division in the battle along the Wolma by seizing the crossings over the river Plitsch, about 15 miles in rear of the hostile line. As landing point, a Red airdrome used by bombing and pursuit aviation, was designated. A detailed reconnaissance to determine the layout, garrison, and antiaircraft defenses of this airdrome was made by observation aviation. After evaluating the information brought back by the observation, several squadrons of light bombers, protected by pursuit, bombed the hostile airdrome. These were followed by strong attack aviation which was to attack the ground personnel. Red pursuit was able, however, to take the air very quickly, in spite of the Blue attack. They were able to inflict heavy losses on the Blue bombing squadrons. A bitter fight was waged in the air over the possession of the airdrome. While this was going on, the main forces (aviation), covered by pursuit, were able to fly over the airdrome, and at 5:00 PM dropped 1,200 men, 150 machine guns and 18 cannon within seven or eight minutes, by parachute, after having transported them over 100 miles. As

soon as the parachute jumpers had seized the airdrome, other squadrons of transport planes arrived and unloaded the remainder of the aerial infantry.



SKETCH NO. 2
Second and Third Days of Maneuver

It is said that the senior British observer stated: "Unless one has seen this with one's own eyes, one would consider such an operation as totally impossible." General Woroshilow told the foreign observers that this was still largely a practice maneuver in order to develop teamwork among all these groups, but that the last word in the vertical envelopment had not as yet been spoken, and that this type of warfare was deserving a great deal of serious consideration.

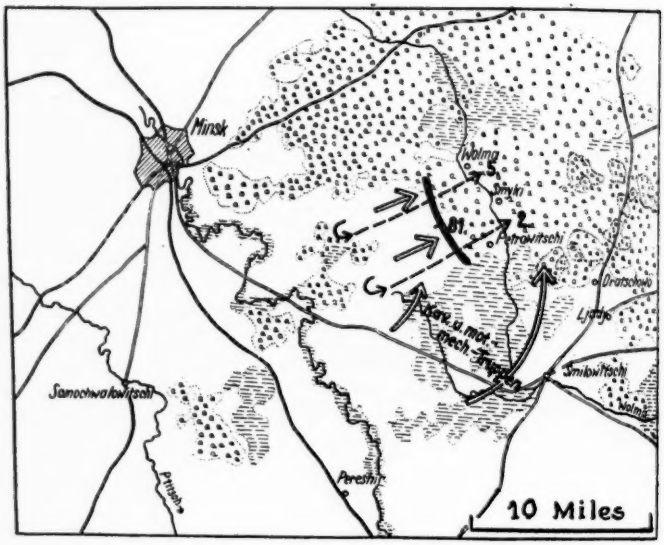
THIRD DAY—10 SEPTEMBER 1936

During the night there was a great deal of activity, especially on the part of Blue, who desired to obtain last minute information for its attack in the morning. Red removed most of its automatic weapons from its outpost line of resistance where they had been located in order to deceive Blue, and moved them back to the main line of resistance. Blue formed

its troops along the line of departure. At 7:00 AM the artillery preparation began. Shortly thereafter Blue attacked with two divisions in front line, under cover of a smoke screen, and everywhere tanks emerged from the lines to ford the stream, break into the Red position, and to attack any targets which the artillery had not silenced. Immediately behind the tanks came the infantry, which fired while advancing, threw hand grenades, and completed the attack with the bayonet. They also were protected by a smoke screen which blew into the faces of the enemy, and blinded him to any Blue movements. Even a Red counterattack, executed by tanks, was unable to halt the Blue advance. Not until 1:00 PM did the attack stop momentarily in front of the Red main line of resistance. It had taken Blue, with a threefold superiority, four hours to reach the main line of resistance. Blue decided to continue the attack and reorganized quickly under the protection of its artillery, mechanized forces, and aviation. The breakthrough succeeded. Cavalry prepared for pursuit. But Red had had adequate reserves of cavalry, infantry, and mechanized forces, which it used to threaten the Blue south flank. This slowed down Blue operations. During the afternoon, both sides committed large aviation forces, which fought each other in aerial combat.

Fourth Day—11 September 1936

The attack of a strong Red force, consisting of the 4th Division, mechanized forces and a cavalry corps (represented by the 6th Cavalry Division), against the Blue south flank forced them back across the Wolma. Blue used the 81st Division as a covering force, while the 2d and 5th Divisions withdrew. but it as well was soon threatened by an envelopment. Red cavalry was just about to intercept the routes of withdrawal of the 2d and 5th Divisions, when recall was blown at noon.



SKETCH No. 3
Fourth Day of Maneuver

Section 3

DIRECTORY OF PERIODICALS

Included in this directory are only those periodicals from which articles have been selected.

See also, Section 7, "List of Periodicals Indexed and Key to Abbreviations."

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ARMY MEDICAL BULLETIN

April 1937

(1) THE LIVER AND GALL-BLADDER DISEASE. Heyd
(2) THE MEDICAL R.O.T.C. Major Welch
(3) MEDICAL ADMINISTRATIVE CORPS NOTES. Major Welch
(4) TRAUMATIC SURGERY OF TODAY AND TOMORROW. Moorhead
(5) ARMY FLOOD RELIEF IN THE OHIO RIVER FLOOD AREA; AN ACCOUNT OF THE ACTIVITIES OF COMPANY G, 1ST MEDICAL REGIMENT. Captain Gorby
(6) HOSPITAL STANDARDIZATION REQUIREMENTS OF THE AMERICAN COLLEGE OF SURGEONS AND THEIR ATTAINMENT BY ARMY HOSPITALS. Lieut. Colonel Walson
(7) SOME CONSIDERATIONS OF CLIMATIC AND WEATHER INFLUENCES AS APPLIED TO MILITARY MEDICINE. Mills
(8) OIL RANGES USED FOR COOKING PURPOSES: COST OF FUEL. Lieut. Colonel Walson
(9) DENTAL TEAMS FOR THE C.C.C. Major Welch
(10) CAUSES OF DEATH: U.S. ARMY COMPARED WITH THE C.C.C. By "G.S."
(11) A DISCUSSION OF THE MEDICAL SERVICE OF THE PROPOSED INFANTRY DIVISION
(12) COSTS IN ARMY HOSPITALS
(13) THREE BLANK FORMS THAT HAVE PROVED THEIR VALUE IN A GENERAL HOSPITAL

ARMY ORDNANCE

May-June 1937

(1) THE ABYSSINIAN WAR. Captain Liddell Hart
(2) FOUR DECADES OF MECHANIZATION. Captain Icks
(3) THE ENGLISH RECRUITING PROBLEM. Belloc
(4) STANDARDS FOR ARMY SUPPLIES. Captain McPike
(5) TRAINING THE RESERVE. Lieutenant Johnson
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(7) FIELD SERVICE PROBLEMS. Part I. Lieut.Colonel Marsh

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(8) RADIO AND PREPAREDNESS. THE INDUSTRY AS A PHASE OF INDUSTRIAL MOBILIZATION PLANS. Major General Harbord
(9) TOMORROW'S WAR. ONE THING IS CERTAIN—IT WILL NOT BE YESTERDAY'S. Hilaire Belloc
(10) ORDNANCE PRINCIPLES. DESIGNS, FACILITIES, AND PERSONNEL ARE THE ESSENTIALS. Major General Tschappat
(11) FORCE IN THE WORLD OF TODAY. WILL OPINION ARRIVE AT A PROPER UNDERSTANDING OF ITS MEANING? Major General Crozier

(12) PROCUREMENT PLANNING. THE BASIS OF THE NEW AMERICAN SYSTEM OF NATIONAL DEFENSE. Lieut.Colonel Barnes
(13) THE TANKS AT CAMBRAI. THE MAXIMS OF BATTLE ARE NOT CHANGED BY MECHANIZATION. (I) Colonel Wagner
(14) ORDNANCE IN REVIEW: THE COLT CENTENNIAL. Lieut.Colonel Goddard
(15) FIELD SERVICE PROBLEMS. Part II. Lieut.Colonel Marsh

ARMY QUARTERLY (Great Britain)

July 1937

(1) MILITARY PRIZE ESSAY, 1937: "DISCUSS THE REORGANIZATION OF THE TERRITORIAL ARMY IN THE LIGHT OF MODERN DEVELOPMENTS, SUCH AS THE AIR MENACE TO THIS COUNTRY AND MECHANIZATION." Captain Telfer
(2) THE GERMAN OFFICIAL HISTORY, 1916. VOLUME X (VERDUN AND THE SOMME, 1916)
(3) LOST OPPORTUNITIES IN 1915? Major-General Bird
(4) THE DEVELOPMENT OF THE GERMAN DEFENSIVE BATTLE IN 1917 AND ITS INFLUENCE ON BRITISH DEFENCE TACTICS. PART II.—THE COUNTERATTACK DIVISIONS. Captain Wynne
(5) MILITARY OPERATIONS: FRANCE AND BELGIUM, 1918. Volume II
(6) THE EDUCATION OF THE OFFICER. Headlam
(7) THE RUSSO-JAPANESE WAR UP TO LIAO YANG. Part I. Captain Kirkby
(8) HERR HITLER'S FOREIGN POLICY. By "Kittiwake"
(9) MACHINE GUNS IN BATTLE. Lieut.Colonel Seton Hutchison
(10) GENERAL VON GALLWITZ'S EXPERIENCES IN FRANCE, 1916-1918
(11) MECHANIZED COLUMNS IN SPAIN. Major Johnston
(12) THE BATTLE OF VALMY: A RECONSIDERATION. Dr. Glover
(13) THE "PROBABLE ACTION" OF THE ENEMY. Lieut.Colonel Burne

BULLETIN BELGE DES SCIENCES MILITAIRES (Belgium)

Captain Wendell G. Johnson, Infantry

January 1937

(1) THÈMES TACTIQUES: L'ARRIÈRE-GARDE ET LE COMBAT RETARDATEUR. [Tactical exercises: The defensive on wide fronts; the flank guard; the rear guard and delaying action.] Major Wanty

Major Wanty completes his series of tactical studies with three problems and discussions on defensive actions.

(2) LE PROBLÈME DE LA DIRECTION DE LA GUERRE DANS LES COALITIONS. [Conduct of war in coalitions.] (VI) Lieut.Colonel Dendal

This is the last installment of Colonel Dendal's study. In his final conclusions the author again stresses the great weaknesses and difficulties of coalitions: delays in conferences when speed is essential; problem of selecting, with common accord, a commander-in-chief; the need for creating a coalition spirit in peace time; and the clash of personalities.

(3) LA TACTIQUE DES ROUTES ET LA LIBERTÉ DE MANOEUVRE. [The tactics of roads and freedom of maneuver.] General Niessel

In his article appearing in "La France Militaire" (2 September 1936), General Niessel alludes to the Italian campaign in Ethiopia to support many of the points he emphasizes in his study. He says: ". . . the rapid construction of roads during the East African Campaign made it possible to give the operations an unexpected speed which exceeded all the most optimistic conjectures based on traditional calculations. The rhythm of the construction work was extremely rapid, and the lay-out of new roads required by the operations represents not only a victory over the enemy, but also over the obstacles of the terrain. And that is attributed to the recent improvements in the technique of road building and the use of cross-country motor vehicles.

"Where the terrain is too difficult for them, these machines can get along with makeshift trails, hurriedly prepared. In this way we solve the problem of the close collaboration of the means of transport adapting itself to the terrain, and the establishment of 'tactical routes' merely sufficing for the use of cross-country machines, and thereby considerably improve tactical movement and supply."

There are two methods for constructing trails rapidly:

Workmen can be echeloned along the projected trace to level the terrain by mechanical processes so as to satisfy the imperative time limits imposed by the maneuver; that is, by carrying out in a few days what ordinarily requires several months. Or the trail can, in its most difficult parts, be built with demountable material prepared in advance like bridging equipment. Thus a tactical route would be launched like a bridge.

The author concludes by saying that the route and the terrain no longer are passive elements or indirect factors in the maneuver, but are dynamic allies of the offensive action, alone capable of gaining the decision. The war in East Africa has shown that the output of the Italian troops depended on the rapid construction of roads, and that their high command is entitled to consider itself a precursor of future methods of waging war.

(4) CRÉATION D'UNE INFANTERIE DE L'AIR. [Creation of air infantry.]

The French air minister announces that the general program for reorganizing the air force includes a series of measures among which is the creation of units of air infantry.

These new units will consist of two light groups which, in case of war, could intervene against the enemy rear areas. The organization of these groups will comprise a company of riflemen and a squadron of transports able to assure the debarkation of the infantry, either by parachute or by landing.

(5) LABORATOIRES DE PHOTOGRAPHIC VOLANTS. [Flying photographic laboratories.]

Recent tests have been made in Leningrad with a plane carrying a complete photographic laboratory.

During a 40-minute flight, the plane climbed to 9,000 feet, took 17 photographs, developed and printed them, and then delivered them by air. Scarcely 15 minutes after being taken the photographs were finished and "air-mailed" in a parachute.

The remarkable part of this equipment is that the laboratory can be used in winter as well as summer, there being a small electric stove installed in the plane which maintains the interior temperature about 53 degrees Fahrenheit; even when outside it is 13 degrees below zero. The essentials for developing the photographs are carried in winter in thermos bottles and, if necessary, warmed before using.

This new development makes it possible to give commanders important photographs far more rapidly than heretofore.

(6) LA PROTECTION AÉRIENNE EN BELGIQUE. [Air defense in Belgium.] Lieut.General Termonia

An outline is given of the defensive measures adopted in the event that Belgium should be subjected to a hostile air invasion. This includes the items of protective equipment provided, the instruction given to civilians, the alarm system, and the active means of defense.

Instructions have been provided telling what is to be done to protect: industrial establishments, electric plants, warehouses and depots, gas plants. Other instructions are also being prepared.

The League for Air Protection is largely in control and is extending its branches throughout the country.

(7) COMMENT SE DOCUMENTER SUR LA DÉFENSE ANTICHARS. [How to become informed on antitank defense.]

The "Bulletin Belge des Sciences Militaires" gives a bibliography of articles and books covering the subject of antitank defense. Unfortunately, this list is incomplete owing to several other studies upon this subject which have recently appeared.

(8) EXPLORATION ET PROPAGANDE PAR LES MOYENS DE TRANSMISSION. [Information and propaganda by the means of communication.] Colonel Fellgiebel

This study is taken from the German magazine, "Militär Wissenschaftliche Rundschau," 15 June 1936.

Beginning with a brief history of the part which means of communication have played during the course of history in deciding the outcome of battle, the author shows how the tremendous progress in developing and improving all forms of communication—telephone, telegraph, radio-telegraph and radio-telephone (both long and short wave)—have intensified the importance of this subject.

Certain rules must be followed to prevent giving information to the enemy. These are:

Limiting traffic to the minimum compatible with the tactical needs; Close surveillance of friendly traffic; Frequent changes in signals, wave lengths, codes, methods of enciphering; Camouflage of nets. Of course there is no absolute solution that is practical.

The radio permits propaganda working on the morale of the interior of the country as well as outside. Here Germany sees herself encircled by powerful transmission stations which can reach the center of Germany. There have been bitter examples of Communist propaganda by Russia in the German language, and two-sided propaganda during the Saar plebiscite.

The propaganda problem must be worked out so that the interior morale is maintained; foreign propaganda is kept out by "holding it off" (?), muddling enemy propaganda, and carrying on counter propaganda to influence public opinion in neutral countries.

We have only to observe the hurly-burly of propaganda thrown out right now from transmitters all over the world, to realize the truth of the author's declaration that the means of transmission are apt to be a prime factor in the outcome of war. Take Spain for example. Both adversaries use the radio to attract adherents to their cause, to inspire their own supporters, and to demoralize the opponent. In fact, had it not been for the rapid action of two clear-headed government supporters who grasped the significance of certain acts at the outset of the civil war and used, one the radio and the other the telephone, to transmit instructions which thwarted the Franco forces, the latter would have had much easier going.

February 1937

(9) LES CONCEPTIONS MILITAIRES DU ROI ALBERT AU COURS DE LA CAMPAGNE DE 1914-1918. [The military ideas of King Albert during the World War.] Major Mersch

The author points out the clear-sighted decisions and plans made by the Belgian King during the early stages of the war. On 14 August 1914, he wisely countermanded the order to retreat. On the 18th he decided to retreat to Antwerp, which was just what the Germans did not want him to do. Thus it was well that Joffre's desires, which were opposed to this action, were not carried out.

(10) LES 210E ET 211E RÉGIMENTS D'INFANTERIE DE RÉSERVE ALLEMANDS AUX COMBATS DE DRIE-GRACHTEN ET DE STEENSTRAAT (1915). [The 210th and 211th German reserve regiments at the combats of Drie-Grachten and Steenstraat, 1915.] Captain Corvilain

Account translated from regimental histories of these two German units.

(11) NOUVEL EXEMPLE D'ÉTUDE DU TERRAIN AU POINT DE VUE DE LA DÉFENSE ANTICHARS. [New example of terrain appreciation from an antitank viewpoint.] Lieutenant Duysens

A concrete example of organizing terrain and siting antitank guns for defense against mechanized attack.

(12) POUR HATER L'INTERVENTION DE L'A./D.I. [Accelerating the intervention of division artillery.] Colonel Verhaegen

The author studies the problem of intensifying infantry-artillery liaison and of accelerating the entrance into action of division artillery. He also reviews the difference between the German and Belgian doctrines on artillery allotment.

(13) LA RÉORGANISATION DE L'ARMÉE DE L'AIR. [Reorganization of the French air force.]

A French decree of 17 September 1936, groups under the single authority of the Chief of the Air Force General Staff, all the functions of command relative to the air defense of the country. This decision was motivated by the desire to bring together into the hands of the chief who would be responsible for air operations in time of war, the preparation for organizing, mobilizing, and concentrating the army of the air.

Accordingly, the general who is designated commander-in-chief of the air armies in time of war, henceforth in time of peace is invested with the triple function of chief of the Air Force General Staff, vice-president of the Air Force Supreme Council, and of inspector-general of the antiaircraft defense of the land.

He will be assisted by two general officers. They will be known as Chief of Staff and Under Chief of Staff of the Army of the Air. In time of war one of them will remain at the Air Ministry in the role of chief of staff and will direct the general staff affairs at the ministry. The other will carry out the duties of major general of the mobilized air armies.

The Air Force Supreme Council consists of:

President—the air minister
Vice-President—the chief of the Air Force General Staff
Members with right of debate and vote—seven division generals (maximum)
Permanent recorder—under-chief of staff of air army
Members with right of debate but without vote:
Technical inspector general of aviation
Under chief of staff of the air army
Director of aviation construction
Director of military aviation material
Chief of the Army General Staff and one other member of the Supreme War Council designated by the minister of war
Chief of the Navy General Staff and one other member of the Supreme Navy Council designated by the Minister of Marine
The general officer in charge of military affairs in the Ministry of the Colonies.

The Air Force Supreme Council is especially charged with advising on: Defense against air attack; Participation of air forces in army and navy operations; Organization of air forces in time of peace and in time of war; The recruiting procedure and general training methods of air force personnel; The combat tactics of air forces; Establishment of construction programs; The allotment to units of new matériel and their effect on the conditions of employment; Industrial mobilization.

To give high commanders in the air forces the same status as they would have in time of war, many changes have been made in the new organization. As before, territorial command is exercised by the commanders of the four air regions.

These four (Dijon, Paris, Tours, Aix-en-Provence) are subdivided into two each, and each of the eight subdivisions is under a general officer. Under authority of the regional chief, the subdivision commander exercises territorial command, command of the air bases, aviation battalions and companies, reserve instructional mediums and pre-military instructional agencies.

In the new set-up, the air base has an important place. It has become a veritable airport, a replica of a seaport. At this port are made repairs, inspections, tests of matériel, and here are kept the planes.

The role of a base in time of peace as in time of war is to assure the putting into operation, in the best conditions, of the aviation units stationed at the base.

The principal task of units is to fight. But first they must be in operating condition. This end the base accomplishes both from an administrative and technical point of view.

The commander of the base, director of the park, responsible for mobilization, for the military instruction of the unit, is primarily concerned with

organizing and insuring the functioning of the services for the benefit of the brigade occupying his grounds and for the units passing through.

The regional commander is charged with the preparation for war of the regional groups of reserves. He is also technical advisor to the commander of the military region in all aviation matters and the employment of air forces with the ground forces.

The relation between regional commands and regional reserve groups is controlled by the inspector general of aviation reserves, whose job is to advise the minister on the classification, instruction, and training of the reserves, and also to control the organization and functioning of pre-military service.

As for personnel, the permanent nucleus is comprised of selected officers and noncommissioned officers. Upon mobilization this nucleus would be reinforced by both active and reserve officers of the air army and also by active and reserve officers of the ground army who are trained in observation and reconnaissance.

Large Air Units

The regrouping of aviation elements was indispensable in order to make possible a powerful and rapid action of the ensemble. For this reason there have been created large air units, homogeneous units, easy to command and directly dependent on the air minister. There is:

A heavy aviation corps—divided into divisions, brigades, and squadrons.

A light aviation corps—divided into brigades, not grouped into divisions.

These corps are placed under the command of general officers having the same rank as regional commanders.

The Air Brigade

The air brigade is the constitutive element of heavy aviation division and of the light aviation corps. It contains several squadrons.

The brigade is the combat unit which is organized, administered, and trained so as to be ready always to go into action without delay. It has a training squadron, communication service, photo service, and services of navigation, fire, etc. In time of peace these services are the instructional medium of the brigade.

The chief duty of the brigade commander is the preparation of these units for their combat mission in time of war.

The squadron is the tactical unit; the group is the elementary unit.

All of these steps have been taken to insure a rapid change from the peace-time administration to a wartime administration.

These groups also have different stations than formerly in order to: facilitate instruction and command; to withdraw units from the frontiers so as not to be in such imminent danger from hostile air attack; to put light aviation close to sensitive points and thus better to insure their defense; to disperse units so that in general not more than two squadrons are at any one base.

Personnel

Age limits have been lowered by five years in order to maintain a younger group in the air service. To fill the vacancies thus created three steps were taken: the personnel of the central administration was reduced; noncommissioned officers were given commissions; reserve officers were put on active duty.

The aviation school has also been reorganized in all its various branches and subdivisions.

(14) La flotte aérienne japonaise. [The Japanese air fleet.]

During the year 1936, the general staff of the Japanese air forces was reorganized. Now independent, this organ is henceforth directly under the emperor and is called the general staff of the commander-in-chief of the air forces.

The new organization of the fleet is designed to give the command more control facilities and a greater development of the air forces. Now the

command of the air forces has been given to an air corps general officer whereas formerly it was given to generals of other arms.

Land aviation will remain separate from naval aviation.

The development of the aviation has accelerated the production of subaltern cadres. The Koumagaia school has been joined with the Tokorodzawa school. The student body has been increased from 150 to 300; accordingly, the number of graduate pilots is doubled. Arrangements also have been made for completing the cadres of reserve aviators.

The aviation mechanics school turns out 250 mechanics a year. Three hundred other specialists are graduated from other schools each year—observers, meteorologists, radio operators, photographers, etc.

Civilian aviation schools recruit particularly for positions in the reserve. There are thirty schools of this type from which come each year 200 pilots and 500 to 600 aviation mechanics.

March 1937

(15) LES PRÉLIMINAIRES DE LA BATAILLE OFFENSIVE. [The preliminaries of the attack.] Major Rosa

The author considers the preliminaries to combat in three probable situations: (a) Attacking, when the enemy occupies an organized position, more or less known, and well supported; (b) Attacking, when the enemy occupies a poorly organized position, or is poorly supported; (c) Attacking an enemy in movement.

In the first case the attacker must advance slowly and methodically. In the second, the attacker must act swiftly and vigorously to prevent the defender from being able to prepare counter-measures. In the third case the action must be methodical at the outset, in order to avoid any surprise action, then becoming a vigorous attack to achieve the first deployment.

(16) CONSIDÉRATIONS SUR LES VOLS EN ALTITUDE. [Notes on high altitude flights.]

Precautions to be taken prior to high altitude flights in order to prevent accidents which are avoidable.

(17) LA DÉFENSE ANTICHARS. [Antitank defense.] Captain Xhaet

Three topics are covered in this study: current tanks in foreign armies, the effect of tanks on tactics, the defensive measures against tanks. The author begins by saying that "the next war may be synthetized in three words: airplanes, gas, tanks."

His comments on tanks in current use are well summed up in a brief table:

TANK	WEIGHT	ARMOR	SPEED	PRINCIPAL MISSION
Ultra-light	2-5 T.	.35-.50 in.	12-43 mph.	Scouting, pursuit
Light	6-9 T.	.66-.79 in.	12-43 mph.	Combat in closer cooperation with infantry
Medium	10-30 T.	.79-1.37 in.	18-31 mph.	Deep penetration in enemy position
Heavy	Over 30 T.	At least 1.37 in.	18-31 mph.	Deep penetration in enemy position
Raiding (Cav. combat cars?)	5-12 T.	Not over .35 in.	43-75 mph.	Long distance raids

As to the effect of tanks on tactics:

Owing to their armor protection and obstacle-crossing ability, tanks are infantry's worst enemy. They take no prisoners. Their speed and protection from rifle and machine-gun fire nullify much of the value of even deeply organized outpost security. Without antitank means, an outpost or security force in good tank terrain cannot resist; it can only warn. Tanks can strike much farther than infantry. Often, supported by aviation and artillery and artificial fog, they must first destroy or disorganize the hostile artillery; then the infantry. They are merciless against retreating troops. Tanks can operate on their own, piercing or outflanking the enemy. Against

tanks and accompanying motorized troops there must be a guard in all directions. Tanks have abolished rear areas. Finally, tanks are feared by many countries because they can make a sudden and deep penetration before a declaration of war, disorganizing mobilization even before it can be ordered.

With airplane and gas, tanks appear to be the most decisive military means of future war, says the author. However, he continues, tanks, being tied to the ground, can be more readily combated than the other two. But one must acquire an antitank spirit.

By way of antitank doctrine, one fundamental rule should be written in letters of fire, says Captain Xhaet; namely, the defense against tanks must be assured in permanent form in every unit—halted, on the march, or in combat.

For this, there are two objectives: To destroy the tanks; to block them with obstacles which they cannot cross or upset. This is done by combining active and passive defensive means. Active means are: artillery, antitank guns, aviation, and the semi-passive weapon, mines.

The author considers passive means most important. The various well-known natural obstacles are mentioned: water courses, steep banks, swamps, woods; and the artificial obstacles are discussed in detail. Among these are: inundations, embankments, minefields, antitank trenches, traps, obstructions, walls, rails. These, of course, are difficult to construct; hence natural obstacles should be utilized to the utmost. Road obstructions by ditching, barricading, mining, and stretching wire cables are described. The 47-mm gun is the standard Belgian antitank gun. The author claims it to be equal to any foreign weapons of its type. It is towed by a light tractor, which can travel three miles per hour at reduced speed as long as necessary without damage to the motor.

In the infantry the operating personnel ordinarily walk; in the cavalry they are transported; in the Chasseurs Ardennais the 47-mm gun is on an automative mount carrying also the personnel and munitions.

Several of the principles emphasized by the author merit consideration. An antitank obstacle always should be defended by the fire of small arms and antitank weapons—in decreasing proportion with the effectiveness of the obstacle. As a general rule, antitank weapons and missions are not assigned until after determining the use and improvement to be made of terrain obstacles. There should be at least four 47-mm guns per infantry battalion. Owing to the brusque and brief tank-antitank struggle, the personnel of antitank guns must be extremely vigilant and act on their initiative. Antitank weapons fire without considering troop safety.

The author considers the several advantages of frontal and flanking fire and concludes that "it depends on the situation."

Command posts, reserves and important installations should preferably be located behind strong antitank defense fires.

Most of the antitank weapons with the advance guard should accompany the point.

The author concludes that the result of a tank-antitank duel will depend largely on the distance at which the defenders see the attackers and the determination of the antitank personnel to stick by their weapons. With adequate means, determination, alertness, and teamwork, the antitankers should come out on top.

In other words, the author believes that, like every other style of combat, a defense, powerfully equipped and on the job with high morale, can beat the attack.

(18) LE TIR DES ARMES PORTATIVES SUR BUT MOBILE. [Small arms fire at moving targets.]

The author points out the error in confining target practice to stationary targets and emphasizes the need for training in moving target firing. He gives some statistics on duration of flight of various bullets at different ranges, also the leads or corrections to be made in aim when firing at targets moving at different speeds. A moving target device is suggested and illustrated.

(19) RÉPERTOIRE D'ÉTUDE TACTIQUES RELATIVES À DES FAITS DE GUERRE. [Catalog of tactical studies relating to incidents of combat.] Major Wanty

The "Bulletin Belge des Sciences Militaires" has compiled a catalog of articles containing tactical studies based on concrete examples of the World War. These are listed below, giving the English translation of the title only, together with the source of the article:

DEFENSIVE

The defense of Chevincourt, 10-11 June, 1918. ("Revue d'Infanterie," July 1924)
The 42d Division (French) at Mort-Homme, 9 April 1916. ("Revue d'Infanterie," July 1926)
The 173d Infantry (French) at the battle of Matz, 9-14 June 1918. ("Revue d'Infanterie," July 1929 to April 1930)
The 79th Infantry (French) at the battle of Rheims. (I) ("Revue d'Infanterie," September 1932)
The 11th French Brigade at the combat of Leernes-Anderlues, 22 August 1914. ("Revue d'Infanterie," January 1933)
The battles of Hauthem-Sainte-Marguerite and of Grimde, 18 August 1914. ("Bulletin Belge," April-September 1930) The battle of Hoegaerde, 18 August 1914. ("Bulletin Belge," July 1935)

DEFENSE OF A RIVER LINE

Defense of the Oise by the 228th Infantry (French) on 28 and 29 August 1914. ("Revue d'Infanterie," July-August 1930)
Defense of the Marne by the 51st Division (French), 15 July 1918. ("Revue d'Infanterie," March-April 1931)

OFFENSIVE

Gaining contact in a meeting engagement: the 40th Division (French), 22 August 1914. ("Revue d'Infanterie," March 1926)
The capture of Mennevret by the 126th Division (French), 18-19 October 1918. ("Revue d'Infanterie," September 1925)
The German Guard at the battle of Guise. ("Revue d'Infanterie," May-June 1927)
The Offensive of Malmaison, October 1917, with a platoon of the 30th Infantry (French). ("Revue d'Infanterie," December 1928)
D'Esternay at the Marsh of St. Gond. German operations on 6 September 1914. ("Revue d'Infanterie," January-June 1929)
Attack of the 6th Infantry (French), 4 November 1918. ("Revue d'Infanterie," January 1928)
Exploitation of success: the 123d Division (French) and the 12th Infantry (French) from 7 to 19 October 1918. ("Revue d'Infanterie," October to December 1926)
The 61st Infantry (French) at the battle of Lorraine, August 1914. ("Revue d'Infanterie," May, June, August 1932)
The capture of Villers-le-Sec, 1918. ("Revue d'Infanterie," October 1932)
The battle of Barcy, 1914. ("Revue d'Infanterie," December 1935)
Operations of the 20th Regiment of the Line (Belgian) during the 1918 offensive. (In "Vu et Vecu," by Major B.E.M. Willems)
Capture of Lombartzyde by the 9th Regiment of the Line (Belgian), 22 and 23 October 1914. ("Bulletin Belge," October 1932 to April 1933)
The 1st Chasseurs on 30 September, 1 and 2 October 1918. ("Bulletin Belge," August to October 1933)

Night Operations

The night battle in the Bois le Chanel, 7 to 9 September 1914. ("Revue d'Infanterie," August 1924)
Night attack of a German battalion, 9 September 1914. ("Revue d'Infanterie," July 1929)
The night counterattack at Jaulgonne, 5 June 1918. ("Revue d'Infanterie," February 1933)
The attack of the 1st Chasseurs on Roulers, 1 to 2 October 1918. ("Bulletin Belge," August 1932)

Tanks

The battles of Laffaux Mill, 5-6 May 1917. ("Revue d'Infanterie," June 1936)
The tanks at the battle of Malmaison, October 1917. ("Revue d'Infanterie," January-February 1932)
Tanks. [Chars d'assaut.] ("Revue d'Infanterie," March 1932)
First engagement of Renault Tanks, May 1918. ("Revue d'Infanterie," August 1935)
Tank battle, 18 July 1918. ("Revue d'Infanterie," October 1935)

Withdrawal

Withdrawal: Retreat 1918. ("Revue d'Infanterie," October 1933-June 1934)

Open Warfare

The 17th French Division at Gedinne-Bievre, 23 August 1914. ("Revue d'Infanterie," February and March 1936)
Works of Lieut.Colonel Grasset on: Rossignol, Ethe, Neufchateau.
The battles of d'Arsimont, by Colonel Valarche.

Raids

Battle of Papegoed, 11 September 1918. ("Bulletin Belge," October 1934)
Raids made at Kippe by the 1st Division (Belgian) the night of 18-19 August 1918. ("Bulletin Belge," December 1929)
Raid of 1st Carabiniers at Nieuport, 29 June 1918. ("Bulletin Belge," November 1933)
Reconnaissance in force on the Chateau of Woumen, October 1917. ("Bulletin Belge," April 1932)
Raid of 4th Chasseurs (Belgian) on Farm No. 1, 28 October 1917. ("Bulletin Belge," May 1932)
The 4th Regiment of the Line (Belgian) covering Craonne, August 1918. ("Bulletin Belge," August 1934)
Assault on the trench of Adrinople, 28 October 1917. ("Bulletin Belge," March 1933)
Raid of 4th Carabiniers (Belgian), 9 September 1918. ("Bulletin Belge," July 1933)
Raid of 7th Regiment of the Line (Belgian), 21-22 June 1918. ("Bulletin Belge," June 1934)
Assault on Canopus-French, 25 June and 28 July 1918. ("Bulletin Belge," December 1934)

Counterattacks

The 1st Chasseurs (Belgian) at Merckem, 17 April 1918. ("Bulletin Belge," October 1931)
The 9th Regiment of the Line (Belgian) at Mercken, 17 April 1918. ("Bulletin Belge," November 1931)
The counterattack on Boyau de la Mort in May and September 1915. ("Bulletin Belge," December 1933)
Recapture of Keyem, 18 and 19 October 1914. ("Bulletin Belge," October 1935)

(20) L'ARMÉE HOLLANDAISE. [The Dutch army.] Lieutenant Agourtine

In an article in "L'Officier de Réserve" (October, November and December 1936), the author points out the unceasing work of Dutch engineers against the incursions of the sea, and the reclamation of land for agricultural purposes.

In Holland the waterways, including canals, have a length of 7,500 kilometers of which 5,000 are open to 50-ton boats. These waterways exercise a pronounced effect on the strategical defense of Holland.

The Dutch colonial empire contains two million square kilometers inhabited by sixty million people.

Compulsory service requires 205 days of duty for infantry, foot artillery, cyclist units, dismounted equipment trains, automotive and quartermaster service; 350 days of duty in the medical service; 400 days in artillery and mounted equipment trains; and 490 days in the cavalry. In the naval aviation the duration of service is 280 days, and 360 days in land aviation. Reserve duty periods are: 20 days for infantry, and 40 days for other arms except aviation which has no periods owing to the large number of members.

Of the theoretical contingent of 23,500 recruits, 13,500 are infantry, 4,650 artillery, 1,800 engineers, 1,200 cavalry, 650 cyclist units, and 200 aviation.

The Landstorm volunteers number 55,000 members.

The peace-time army comprises the general headquarters, four divisions, a light brigade, a regiment of coast artillery, an antiaircraft artillery corps, a regiment of engineers, a corps of ponton trains and mine planters. Each division is composed of a headquarters, three infantry regiments, an artillery regiment, a liaison group, a machine-gun company, a cyclist troop, a company of sappers. Moreover, one of these divisions has a motorized artillery regiment. The light brigade consists of a headquarters, a cyclist regiment, two Hussar regiments, and a corps of mounted artillery.

There are 24 infantry regiments in the wartime army. At war strength, a regiment is formed of a headquarters, a 4-gun antitank battery (60-mm), a 6-piece mortar company (80-mm), and three battalions. Each battalion comprises a headquarters, three rifle companies, and a machine-gun company. A rifle company is divided into a headquarters platoon and four platoons, each of three groups—two of riflemen and one of light machine guns. The machine-gun company has a headquarters platoon and four combat platoons of three guns each.

The cavalry comprises two regiments, each of four troops, a machine-gun troop, and a battery of 60-mm guns.

The artillery comprises eight light field artillery regiments, a coast artillery regiment, a motorized regiment, an antiaircraft corps, and a mounted artillery corps.

The engineer regiment has three battalions, each of two companies (except one of three companies), and of two ponton and mine-planting companies.

Owing to the aquatic nature of the country, there are no tanks, but there are two armored-car troops.

Two hundred and fifteen airplanes are in the continental air force; Fokker, Koolhoven, and Dornier planes are used.

About 20,000 men are under arms in the continental force. The colonial army is independent of this force.

(21) L'INFANTERIE SUR CHENILLES. [Italian tank units.]

The Italian army recently has organized the distribution of tanks within infantry divisions. There are four regiments of "fanteria carrista."

These regiments contain a varying number of battalions which ordinarily are corps troops.

Each battalion has companies of two platoons of ordinary tanks and one platoon of flame-throwing tanks. There are as many companies in the tank battalion as there are infantry divisions in the army corps. There is also a company of cannon tanks having as many platoons as there are infantry divisions in the army corps to which assigned.

The tanks in service are: The ordinary combat tank (two machine guns dual mounted); The ordinary flame-throwing combat tank (one machine gun and one towed flame-thrower); The cannon tank (one antitank cannon 37/26-mm); The breakthrough tank (two machine guns or one 37-mm gun). All these tanks weigh about 5.5 tons.

Employment.—To open the way for infantry in close liaison with it, the cannon tank opposing counterattacks by tanks.

Employment in mass.—At H-hour the tanks depart at full speed, and reduce the resistances up to the assigned objective. The depth of the tank formation should enable infantry to follow them at 200 yards in order to profit by their action.

In the defensive, the tanks will not only be employed in counterattacks to act swiftly and temporarily against a force which has penetrated the lines, but also as an important element of fire of the line of battle, with the object of reinforcing or supplanting the artillery fire and of serving as antitank weapons.

(22) LE MATÉRIEL DE MOTORISATION AU COURS DE LA CAMPAGNE EN ETHIOPIE. [The automotive equipment used during the Ethiopian campaign.]

Enumeration of types of automotive vehicles used by the Italian Army in Ethiopia. Gives names, speeds, capacities, weights, motors.

(23) LA CONQUÊTE DE L'ETHIOPIE. [The conquest of Ethiopia.]* Gentizon

Mr. Gentizon's book on the conquest of Ethiopia contains one chapter dedicated to the role of aviation during the recent East African campaign. He shows how the fifth arm was able to carry out its missions of reconnaissance, of scouting, and of photographing. The latter especially permitted the cartographic section installed at Asmara to prepare maps of the various regions. He shows how aviation was a powerful means of destruction on the battlefield and how its action was particularly decisive at the moment when the adversary showed the first signs of weakening and began to retreat. "At that instant, the aviation, launched in mass—reconnaissance squadrons, bombardment squadrons, pursuit squadrons—acting in a powerful defensive spirit, on every occasion transformed into complete routs the retreats which without the air arm would have been able to have been carried out in a normal manner. Such was the case, especially after the battles of Enderta, of Tembien, of Chire, and of Ascianghi."

In these cases the aviation more than fulfilled the mission of cavalry which would not have been able to molest the rear guards and flanks of the columns of retreat; the aviation practically wiped out the enemy columns.

"Aviation not only contributed to the ground fighting by scouting and bombardment action, it also functioned as a medium of supply. By so doing, it gave the troops an unknown and unexpected freedom and speed of movement by freeing them from the difficulties of supply over difficult communications sown with ambushes. Supply by air enabled large units to live, march, maneuver, fight, resist in unexplored zones. For everything—ruggedness of terrain, climate, absence of all vegetation and water—conspired to prevent or at least to render extremely difficult the movements of modern armies.

"Without aviation, the march of the III Corps from Antalo to Tembien by the shell of Gaela—that of the IV Corps across the desert region of Adi-Abo—could not even have been contemplated. In both cases and likewise during the march of the Starace columns on Gondar, Ruggero on Sardo, and the advance of the large motorized column on Addis-Ababa, the air force functioned on various occasions like a real supply train."

Time after time entire squadrons dropped tons of food, water, and munitions to the troops. When the matériel was such that it could stand the shock of being dropped to the ground it was merely put in a sack filled with straw or hay, or simply thrown overboard.

"For more delicate provisions the parachute was employed. As for water, it was put in large cylinders holding 100 and 200 liters, having

*This book is contained in the C. & G.S.S. Library.

springs to reduce the shock. A trap was opened under the fuselage and the cargo dropped slowly by parachute. In Dankalie, live kids, and even sheep, were transported and dropped in this way through the air for the subsistence of detachments crossing the desert country. This was the first instance of transporting live animals for the supply of units on the march. Considering the tropical temperature of the region, no butchered meat would have remained fresh. In short, during the Ethiopian campaign, aviation succeeded in supplying thousands of men with water, with tinned meat and vegetables, with sacks of flour, biscuits, sugar, fruit, tobacco, cigarettes. It replenished the munitions of units which during the course of combat began to run short; it transported for foot troops, various items of equipment—canteens, shoes, tents, shirts, socks—and dumped alongside motorized columns, tires and even automobile parts. It performed the service of quartermaster; it distributed the mail; it became a flying bank—carrying to various army corps bags of money or bank bills for the purchase of food and the pay of the troops. In the single sector of Eritrea, from 4 to 22 April, the air service supplied the troops by dropping 400,000 kilograms of food stuffs and matériel. It also transported headquarters staffs and even, at the finale, transported from Makalle to Dessye, the high command of East Africa with all its services, its personnel, its records, its installations, its radio stations, its telephone and telegraph centers.

"For the first time in history, the headquarters of an army of 300,000 men was transferred from the rear to the front over a distance of more than 180 miles in one hour and a half."

Following the capture of the Abyssinian capital, 8 large bombardment planes in 12 days transported 21 officers and 798 men from Makalle to Addis-Ababa, that is, an entire battalion with its complete armament, munitions, heavy and light machine guns, besides knapsacks, tents, and rifles. Six radio stations with the engineer technical personnel constituted a part of one of these convoys. Moreover, the battalion was provided with 10 days of reserve rations and numerous replacement articles, inasmuch as it would have to enter into campaign as soon as it was transferred to Addis-Ababa.

"Another important fact: During the entire duration of the war the airplane proved itself to be an excellent command post."

Marshal Badoglio and Marshal Graziani, both of whom have pilot certificates, used aviation not only for transport from one region to another or for personal reconnaissance of the terrain, but also to direct operations during the large battles. Their example was constantly followed by the senior officers of the general staff and the commanders of large units on the north and south fronts.

"The daring, self-denial, ability, the spirit of camaraderie of hundreds of Italian aviators who gave themselves freely during the seven months of war, enabled the maximum utility to be obtained from the arm they controlled. Their great heroism may be realized when their record is examined: 7,500 combat flights, 44,000 hours of flying; 1,700 tons of explosives dropped on the enemy, and 1,000 tons of foodstuffs transported for the supply of troops; 872 bombardment actions, 454 offensive reconnaissance flights, 830 distant reconnaissance missions, 2,189 close reconnaissances, and 168 machine-gunning actions carried out at low altitude. Two hundred and fifty-nine planes were struck by enemy fire, 8 planes were shot down, and 87 pilots and mechanics sleep their last sleep in East African soil. These figures assume their highest value in view of the fact that at the end of hostilities only 500 planes—reconnaissance, pursuit, and bombardment—were in East Africa."

From this interesting study of the role played by aviation, the author concludes:

"The Ethiopian War made it possible to view aviation in rather a new light. The squadrons launched in the air summed up the special activity of all the army. The aviation was able to see everything; it was able to fight everything; it was able to transport everything. By breaking up the enemy into small groups from the very beginning it disorganized the mobilization of the Abyssinians and made their supply difficult. It prepared the

battle; it engaged in the battle, it exploited the battle. In open combat, it seconded the advance of the infantry by straffing the enemy positions at low altitude; after the victory, it operated like cavalry of the Napoleonic style by pursuing and annihilating the enemy; it facilitated the task of the engineers by denying the passage of rivers with formidable barrage fires. Alongside the artillery it was a cannon. It served as supply trains; it replenished entire units with bread, water, and munitions. It transported the general staffs from one region to another, and enabled the high command to direct the operations in a more certain manner. As an ambulance, it served to carry wounded to the rear for urgent operations. Attached to the intelligence service, it transported behind the enemy lines (in Somalia) emissaries who were charged with winning the natives to the Italian cause.

"In brief, the experience in East Africa proved, in all regards, that the possession of supremacy in the air is one of the most decisive elements of success.

"Of course, this was only a colonial war. The fifth arm cannot manifest itself in Europe as in an African region. For this reason it would be dangerous, from what occurred in East Africa, to deduce absolute doctrines and principles for the employment of military aviation over our continent [Europe]. But, in any case, the results of the Abyssinian campaign are the forecasts of a profound radical evolution in the character and form of future wars. Each day of the Italo-Abyssinian conflict proved that aviation is the most powerful instrument of our times put to the disposition of an army, and that it behooves us to consider it, henceforth, as being at the center of all military problems of the future."

CANADIAN DEFENCE QUARTERLY (Canada)

July 1937

(1) CANADA'S DEFENCE POLICY. The Right Honourable Bennett
(2) CAPITAL SHIPS VS. AIR ATTACK
(3) JAPANESE ACTIVITIES IN NORTH CHINA AND INNER MONGOLIA. Colonel Nikolaieff
(4) Some of the natural resources of Canada. The Honourable Crerar
(5) THE DEFENCE OF THE MARITIME PROVINCES DURING THE WARS OF THE FRENCH REVOLUTION. Stanley

CAVALRY JOURNAL

March-April 1937

(1) LIEUTENANTS OF 8TH CAVALRY IN 150-MILE ENDURANCE RIDE. Lieutenant Haines
(2) FIVE HORSES—AND A DEVIL. Colonel Romeyn
(3) PARTICIPATION OF UNITED STATES ARMY HORSEMEN IN CHILEAN CELEBRATION. Major Cole
(4) TWENTY YEARS OF EVOLUTION IN AMERICAN CAVALRY EQUIPMENT. Major Grow
(5) GREEK HORSEMANSHIP AND HORSEMASTERSHIP. Colonel Spaulding
(6) SMOKE AT GETTYSBURG. Captain Coulter
(7) THE DAY BEFORE CANTIGNY. By the author of "Portrait of a Soldier"

May-June 1937

(8) A 6TH CAVALRY COMMAND CAR. Major Williamson
(9) A PROFITABLE SQUADRON MARCH. Major Cummings
(10) GENERAL CURÉLY, CAVALRY LEADER AND TROOPER. Lieut.Colonel de Dalmassy
(11) A REAL TEST FOR HORSES. Captain Kester
(12) THE COUNTERATTACK. ACTION OF THE 4TH SQUADRON, 10TH CHASSEURS, ON MAY 31, 1918
(13) RECONNAISSANCE AND ATTACK PROBLEMS. Captain Stockton

(14) SPORTS AS A MEANS OF TRAINING FOR COMBAT LEADERSHIP. Captain Holbrook
(15) A MAP PROBLEM: PURSUIT AND EXPLOITATION
(16) THE EFFECTIVE RAPIDITY OF FIRE. Lieutenant Merrill
(17) CAVALRY IN THE BREAKTHROUGH OF SVENTSIANY, SEPTEMBER 9-30, 1915. General Inostrantsev, Imperial Russian Army

CAVALRY JOURNAL (Great Britain)

January 1937

(1) TWO CAVALRY EPISODES IN THE PALESTINE CAMPAIGN, 1917-1918. Part II. General Sir George Barrow
(2) THE THIRD CAVALRY DIVISION AT LOOS. Colonel Preston
(3) SUDAN PATROL. PART II. "THE AFAK ATWOTS." Major Lamb
(4) JAPANESE CONSOLIDATION IN MANCHUKUO. Captain Boord
(5) A NOTABLE CAVALRYMAN OF THE FRANCO GERMAN FRONTIER. "MORE RECOLLECTIONS OF A PRUSSIAN HUSSAR." Lieut.Colonel Baker
(6) SPIRIT OF SERVICE. Major General Sir John Moore

April 1937

(7) TWO CAVALRY EPISODES IN THE PALESTINE CAMPAIGN, 1917-1918. Part III. General Sir George Barrow
(8) A FORGOTTEN CHARGE—THE BRITISH CAVALRY AT LAFFELT. Lieut.Colonel Burne
(9) BRITISH CAVALRY IN EUROPE IN THE TIMES OF WELLINGTON. By "Thistle"
(10) THE ARMY, THE OFFICER AND THE HORSE. By "You Have Been Warned"
(11) ABYSSINIA AS IT WAS. Maydon
(12) CAVALRY BATTLE HONOURS. THE PENINSULA WAR. Major Edwards

CHEMICAL WARFARE BULLETIN

July 1937

(1) COUNTERBATTERY. Colonel Lanza
(2) DETECTION OF TOXIC GASES
(3) TWENTY MINUTES OF CHEMICAL WARFARE. Major Barker
(4) A CHEMICAL OFFICER AT THE FRONT. Lieut.Colonel Riegelman
(5) RUSSIAN MANUAL FOR DEFENSE AGAINST CHEMICAL ATTACK

COAST ARTILLERY JOURNAL

May-June 1937

(1) SECURITY. Congressman J.W. Wadsworth
(2) WAS LAWRENCE A GREAT SOLDIER? DeWeerd
(3) ANTIAIRCRAFT MACHINE GUNNERY. Major Taliaferro, Jr.
(4) THE WILL OF THE LEADER. (IV) Major Tindall
(5) THE FORTUNATE ISLANDS. Major Smith
(6) THE MISUSE OF AIR POWER. Irvine
(7) RECENT DEVELOPMENTS IN SUBMARINE MINING. Major Englehart
(8) CHANGES IN ANTIAIRCRAFT TACTICS. Major Irvine
(9) ANTIAIRCRAFT RECORDS SECTION. Lieutenant Corbin, Jr.
(10) TELEPHONE AMPLIFIERS. Lieutenant Sawyer
(11) TACTICS ISN'T COMMON SENSE. By "Impertinax"

FIELD ARTILLERY JOURNAL

May-June 1937

(1) CHART OF CERTAIN ELEMENTS OF THE PROPOSED INFANTRY DIVISION
(2) THE PROPOSED DIVISION PASSES IN REVIEW. Lieut.Colonel Christian

(3) "THE ARTE OF SHOOTING IN GREAT ORDNAUNCE." Colonel Spaulding, Retired
(4) ARTILLERY MISSIONS AND DOCTRINES. Colonel Greer
(5) "BRIDGEHEADS OF THE MARNE." Colonel Lanza

FIGHTING FORCES (Great Britain)

June 1937

(1) "NON-COMBATANTS IN WAR." Lieut.Colonel Baird Smith
(2) NATIONAL DEFENCE. Lieut.Commander Hutton
(3) "FLEET AIR ARM MEMORIES." Money
(4) THE CLIMAX OF LIAO-YANG. Lieut.Colonel Burne
(5) COLLECTIVE MILITARY TRAINING, 1937

INFANTRY JOURNAL

May-June 1937

(1) WAS LAWRENCE A GREAT SOLDIER? DeWeerd
(2) WE CAN TAKE IT. Part I. Major Cooke
(3) CONTROL. Major Johnston
(4) A NIGHT ACTION IN THE CARPATHIANS. v.Berchem
(5) FIRING FROM PHOTOS. Captain Kelly and Captain Johnson
(6) THE SECOND ARMY MANEUVERS. Major Hones
(7) THE WILL OF THE LEADER. Part IV. Major Tindall
(8) THE MISUSE OF AIR POWER. Irvine
(9) TACTICS ISN'T COMMON SENSE. By "Impertinax"

JOURNAL OF THE ROYAL ARMY MEDICAL CORPS (Great Britain)

May 1937

(1) THE EXPERIMENT ON SUB-STANDARD RECRUITS. Captain Capon
(2) LETTERS FROM THE PENINSULA. Written in 1811 by Captain Cranstoun George Ridout, 11th Light Dragoons
(3) REPORT ON THE HEALTH OF THE ARMY FOR 1935
(4) MEDICAL AMINISTRATION IN THE SOUTH AFRICAN WAR
(5) WAR EXPERIENCES OF A TERRITORIAL MEDICAL OFFICER. Major-General Luce

June 1937

(6) HEAT EXHAUSTION AND DEHYDRATION IN THE ARABIAN DESERT. Lieut.Colonel Stott
(7) WAR EXPERIENCES OF A TERRITORIAL MEDICAL OFFICER. Major General Luce

July 1937

(8) HISTORICAL NOTES ON BARRACKS—SCOTTISH COMMAND. Lieut. Colonel Kempthorne
(9) THE CAUSE OF SORE FEET AMONGST TROOPS AND A SUGGESTED REMEDY. Captain Curran
(10) WAR EXPERIENCES OF A TERRITORIAL MEDICAL OFFICER. Major General Luce

JOURNAL OF THE ROYAL ARTILLERY (Great Britain)

April 1937

(1) FRENCH AND GERMAN MANOEUVRES. Major General Rowan-Robinson
(2) SOME PROBLEMS OF MECHANIZATION. Lieut.Colonel Davidson
(3) MANOEUVRES, 1936. Colonel Wason

(4) ZEEBRUGGE AND FUTURE BLOCKING OPERATIONS. By "Centaur"
(5) PALESTINE, 1936. Lieutenant Webb
(6) SUGGESTED DESIGN FOR A CLOSE DEFENCE MINIATURE RANGE. Major Norman

July 1937

(7) THE RÔLE, ORGANIZATION AND TRAINING OF ANTI-AIRCRAFT GROUPS WITH A VIEW TO THEIR EMPLOYMENT TO THE BEST ADVANTAGE IN: FORWARD AREAS OVERSEAS; BASES OVERSEAS. ("Duncan" Gold Medal Essay, 1936/37) Captain Bourne
(8) THE Q.M.G. IN INDIA. General Sir Edmund Ironside
(9) THE FIRST BATTLE OF GAZA. Lieut.General Sir George MacMunn
(10) NORTH-WEST FRONTIER OPERATIONS—SEPT./OCT., 1935. Major Shapland
(11) A "LIVE" MINIATURE RANGE. Major Garry
(12) THE GERMAN ARTILLERY. Colonel Schlieper, German Army
(13) BERTRIX, 1914. SEEN FROM THE GERMAN SIDE. By "A.G.M."

JOURNAL OF THE ROYAL UNITED SERVICE INSTITUTION
(Great Britain)

May 1937

(1) MECHANIZATION. Colonel Martel
(2) ANTI-AIRCRAFT DEFENCE. Lieut.Colonel Loch
(3) STRATEGIC MOVEMENT BY RAIL: THE AUSTRIAN TRENTINO OFFENSIVE IN MAY, 1916. Major Napier
(4) THE DEVELOPMENT OF THE FLYING BOAT. Harper
(5) THE GROUPING OF INFANTRY DEPOTS. Major Williams
(6) FUELLING IN THE AIR. Squadron Leader Boyle
(7) CO-ORDINATION OF THE CIVIL POPULATION WITH THE SERVICES. Major Noakes
(8) THE INTERNATIONAL SITUATION: THE SPANISH CIVIL WAR

JOURNAL OF THE UNITED SERVICE INSTITUTION OF INDIA
(Great Britain—India)

April 1937

(1) THE ARMY UNDER CHANGE.—A CRITICISM. Major Wade
(2) INDIAN CAVALRY REORGANIZATION, 1937. Major Chappel
(3) THE SINO-BURMESE BOUNDARY. Captain Angwin
(4) ARMAMENT AND ORGANIZATION OF THE ARMY IN BURMA. Major Hurst
(5) THE HANOVERIAN REGIMENTS IN INDIA, 1782 TO 1792. By "Decurion"
(6) THE USE OF HEAVY TRANSPORT AIRCRAFT IN ARMY MAINTENANCE. Captain Wyndham

DIE KRAFTFAHRKAMPFTRUPPE (Germany)
(Formerly, **Sanct Christophorus**)

By Lieutenant Colonel S. J. Heidner, Infantry

January 1937

(1) KAMPFWAGEN UND ABWEHR WÄHREND DES WELTKRIEGES. [Tanks and antitank defense during the World War.] (See abstract, page 57)
(2) FÜNFUNDZWANZIG JAHRE TANK. [A tank of twenty-five years ago.] This is an article written by General Burstyn (Austria), upon the request of the editors of "Die Kraftfahrkampftruppe," in which he describes a tank which he designed and patented in 1911. The tank was gas-propelled, and ran on caterpillar treads. It was fully armored with a revolving turret

designed to receive a 30-mm or 40-mm gun. The unique feature of the tank was an outrigger arrangement forward and aft to enable the vehicle to cross obstacles. Burstyn offered his invention to both the Austrian and German governments, but received no encouragement.

(3) VOR- UND NACHTEILE DER SELBSTFAHRLAFETTE. [Advantages and disadvantages of the self-propelled mount.]

Under this title appear two short articles which continue the discussion on the type of mount desirable for the antitank gun. Both authors believe that antitank guns on self-propelled mounts, capable of going into action instantaneously, are necessary for the protection of troops on the march. Both also agree that on the defensive, where concealment is of primary importance, the towed gun is more advantageous. Hence they agree that guns of both types are necessary. As an additional reason for not having all the antitank guns mounted on self-propelled mounts, one of the authors points out that the expense would be prohibitive.

(4) KRAD MIT BEIWAGEN ODER LEICHTER PKW.? [Motorcycles with side cars or light armored cars?]

The discussion as to whether the motorcycle with side car or the light armored car is the best vehicle for use in mechanized rifle units is carried forward from the November 1936 issue of this magazine (Sanct Christophorus). Two writers contribute their views in this article. The first favors the use of a light, short, four-wheel drive and steering armored car designed to carry at least four men. This solution, he argues, requires fewer vehicles and therefore less road space, the unit will have greater cross-country ability, the vehicles make less noise, and the crews are transported with much less fatigue. He also believes that the modern motorcycle is not strong enough to carry a side car and three men with their equipment and extra ammunition, and will consequently be subject to frequent breakdowns. The other writer takes the opposite view. If the modern motorcycle is too weak for the task required of it, it should be made stronger, he states. He thinks that having more vehicles in the unit will be an advantage in carrying out the particular type of missions for which mechanized rifle units will be used, such as reconnaissance and security. He considers that the greatest advantage of the motorcycle is in its ability to turn about on a road and in its lightness which permits it to be easily pulled or lifted over obstacles.

February 1937

(5) KAMPFWAGEN UND ABWEHR WÄHREND DES WELTKRIEGES. [Tanks and antitank defense during the World War.] (See abstract, page 57)

(6) MOTORISIERUNG UND HEERESVERSORGUNG. [Motorization and supply.]

This is a short article in which the author discusses some of the supply problems of the future. He believes, that in spite of the great efficiency of motor transport, the supply of an army remains a vital issue due to the great consumption of ammunition by rapid-fire and automatic weapons. The supply of a modern army without motor transport is unthinkable. The efficiency of motor transportation on hard roads is at least five times that of horse transportation. Only in the forward areas where hostile artillery fire is effective is there any use for the horse, and here he may be replaced by cross-country trucks. In the zone of the army, where the supply problem is concerned with moving large quantities over hard roads, heavy trucks, preferably with trailers, are the most efficient. In the division zones light trucks should be used to give greater flexibility. The two-ton truck, extensively used in commerce, should be satisfactory. At the beginning of the last war, the rear areas of divisions were jammed with supply columns. This, the author believes, will be different in the future. Supply columns can remain well to the rear and still get forward in time when needed by a rapid bound. Supply columns must have a movement schedule independent of that of the troops.

(7) LUFTWAFFE UND PANZERWAFFE. [The air force and the tank.]

Of the two elements of tactics, fire and movement, fire had the upper hand during the last war. Movement was dethroned from its decisive

position. However, during the last third of the war, two new factors appeared which challenged the predominant position of fire-power, and threatened once more to bring about decisive results by maneuver. They were: the use of the air force in ever increasing strength against military, industrial, and transportation centers behind the front; and the introduction of the tank with its possibility of crossing wire entanglements and trenches to get at the all-powerful machine gun.

The tank of the World War was intended as an auxiliary to the infantryman; it had only the speed of the man on foot. Today, tanks have the speed, radius of action, maneuverability, and mechanical perfection to make them available as the basis of mechanized forces which can engage in independent actions on distant missions. Their speed and radius of action should permit them to be used to strike the enemy from the flank or rear at a chosen moment when he is most vulnerable. Employed in mass on carefully chosen terrain at the critical moment of a battle, they should have a decisive influence.

The unique powers of the air force are its speed and its great radius of action. The blows of a bombing squadron will fall unexpectedly and with great effect. But the air force can not act continuously. It can destroy, but it can not occupy. The results gained by air bombardment will most often be only partial and consequently reparable.

The greatest results are to be had from these two arms when they are properly used together. With the air force to prepare its way, the mechanized force should be able to strike vital objectives deep within the enemy's lines. The proper timing of such a combined attack will be very important in order to get the maximum effect.

(8) SPERRZONEN UND MOTORISIERTE AUFKLÄRUNG. [Road-block zones and motor reconnaissance.]

The armored car, a road-bound vehicle, has been developed since the war as a means for distant ground reconnaissance. The counter-measure that has followed is the line or zone of defended road blocks. Since the armored car can not leave the road, it is a comparatively simple matter to establish such barriers against it. To continue its mission, the reconnaissance unit must look for a weak place in the line of road blocks, and fight its way through. For this purpose infantrymen transported by motorcycles were added to the reconnaissance units. Some cavalry enthusiasts even advocated carrying horse cavalry along in trucks to be used in reducing road blocks. But any such method of reducing a defended road block requires too much time, especially as the defender can move reinforcements to the threatened road block while the reconnaissance unit brings up its striking force. The correct solution for the overcoming of road blocks by reconnaissance elements must be in the development of cross-country reconnaissance cars, which can promptly leave the road and attack the defenders of the road block from the flanks or rear before they can be reinforced.

March 1937

(9) KAMPFWAGEN UND ABWEHR WÄHREND DES WELTKRIEGES. [Tanks and antitank defense during the World War.] (See abstract, page 57)

(10) WARUM FÜR FERNAUFKLÄRUNG SCHWERE PANZERSPÄHWAGEN? [Why heavy armored scout cars for distant reconnaissance?]

The author begins his article by stating that the requirement of reconnaissance, "to see without being seen," and the wishes of the finance minister, would be best satisfied by a small, inconspicuous, light vehicle. But an analysis of the requirements for distant reconnaissance, and this is a primary mission for scout cars, leads him to a different conclusion. A car used on distant reconnaissance must be fast and must have a large radius of action. Moving fast, it will necessarily run into ambushes, hence it needs at least light armor. The armor should extend overhead so that the crew can not be picked off from housetops or other elevated positions. The car should be armed with an antitank gun and a machine gun so that it can fight its way through hostile screens when necessary. There must be a driver and a gunner for the car. If the leader is to carry out his reconnaissance mission, he can not perform either of these jobs, hence there must be

a crew of at least three. If the car has two-way steering, and this is very desirable, a fourth man is needed on the crew. This fourth man could also perform the duties of radio operator. These considerations convince the author that a heavy armored scout car will be required for distant reconnaissance.

MARINE CORPS GAZETTE

May 1937

(1) THE BATTLE OF BIRGOT. Major Patroni, Italian Army
(2) DURABLE TRAINING. Captain Kenyon
(3) TERRAIN AND COMBAT METHODS. Colonel Miller

MILITARWISSENSCHAFTLICHE MITTEILUNGEN (Austria)

By Major F. During, Infantry

January 1937

(1) DIE REICHSBEFESTIGUNG ÖSTERREICH-UNGARNS ZUR ZEIT CONRADS VON HÖTZENDORF. [The Austro-Hungarian fortifications during Conrad v.Hötzendorf's time.] (IV) Major General v.Steinitz and Major General v.Aarenau

In this concluding installment the authors describe the fortifications on the Balkan front and the part they played in the Austrian campaign against Serbia and Montenegro during the World War.

(2) GEDANKEN ZUR TAKTIK DER MILITÄRISCHEN BRANDSTIFTUNG. [Thoughts on tactics of military incendiarism.] Dr. Kastner

Development of the air arm has caused a revolutionary change in the views on fire as a means of destruction of material that is vital to the enemy. Fire fighting and protection against fire have played a subordinate part in military organization up to the present, but according to the author they must be regarded now as matters of extreme importance.

(3) NEUE GESCHÜTZE DER ITALIENISCHEN ARMEE. [New guns in the Italian Army.] Major General Rieder

(4) ZUR SCHULDFRAGE DES WELTKRIEGES. [The question of war guilt.] Major General v.Steinitz

February 1937

(5) DIE ÖST.-UNG. TECHNISCHEN TRUPPEN UND STÄBE. [The Austro-Hungarian technical troops and staffs.] Major General v.Aarenau

The author deals with the development of technical troops since the Thirty Years' War.

(6) FALLSCHIRMTRUPPEN. [Parachute troops.] Lieutenant Hackl

After giving a brief history of the parachute, the author describes the modern parachute and the method of using it. Parachute troops can be used for the destruction of bridges in rear of enemy lines and important points on the line of communications. Their action will be one of surprise, and according to Lieutenant Hackl, it will often be possible to get them back safely.

(7) DER BÜRGERKRIEG IN SPANIEN. [The Civil War in Spain.] (II) General Wiesinger

This installment considers the affairs up to 20 January 1937. The main operations under review are those at and near Madrid. Conditions of stabilized warfare had existed at that front, when Russian influence prevailed upon the Spanish government to turn the flank of the Nationalists. This change took the latter by surprise and made it somewhat difficult for them.

March 1937

(8) GRUNDFORMEN NEUZEITLICHER KRIEGE. [Future warfare.] General Eimannsberger

The author gives his ideas as to future warfare, based on the mechanical developments that have taken place in recent years and the progress and expansion of the air force in all countries.

The machine gun was the weapon that held up attacks during the World War. In a future war, an infantry attack of the 1914 pattern is no longer possible. An artillery attack on a large scale presupposes stabilized warfare. Neither an infantry attack with tanks, nor a tank attack on a large scale, will bring decisive results. General Eimannsberger believes that a struggle between two forces of about equal strength will eventually develop into stabilized warfare.

(9) MISZGLÜCKTES "KARFREIT." [A miscarried "Caporetto."] Colonel v.Hubka

This is an account of an incident in the Austro-Italian War that occurred five weeks before the Caporetto disaster. In September 1917 the Austrian dispositions in the Trentino were betrayed to the Italians by the Slovene officer Pivko. The Italians took advantage of this information by making a surprise attack at Carzano during the night 17-18 September. This attack miscarried. It is a moot question whether the success of this attack would have saved the Italians from their subsequent disaster at Caporetto.

(10) ARTILLERIEVERWENDUNG IM GEBIRGE (OBERER ISONZO 1915). [Employment of artillery in mountainous country (Upper Isonzo, 1915).] Major Heydendorff

The author describes the services rendered by the Austrian mountain artillery in the fall of 1915 in holding up the Italian advance.

MILITAR-WOCHENBLATT (Germany)

By Major E.F. Koenig, Infantry

5 March 1937

(1) GROSZKAMPFSCHIFF ODER FLUGWAFFE? [Battleship or aviation?] Admiral Meurer, Retired

A very brief, concise, and logical article on the question as to whether or not aviation has outmoded the battleship. The article was occasioned by the publication in part of a British report on the subject. The British conclusions were that as long as other nations were building battleships, Great Britain would have to do the same, or lose control of the sea.

What are the capabilities of aviation against battleships? The only actual experiments were those conducted off the Capes by the United States, but they were against passive, anchored ships, from aviation flying at ridiculously low altitudes. Bombing aviation has to fly either above 18,000 feet in order to avoid antiaircraft fire, or dive against the target. In the former case there are 33 seconds during which a ship can change its course and avoid the bomb; none of course in the latter form of attack. Torpedoes must be fired by airplanes coming within 30 feet or so of sea level. Both the diving attack and the torpedo attack are difficult, nerve racking, and dangerous; furthermore, not always successful.

The newest development, according to the author, is the "Flying Boat," which can remain in the air a full day, is equipped with artillery, with noiseless (Diesel) motors, and partly equipped with horizontal propellers (autogiro). This the author considers the greatest threat from the air at present, but their numbers are so limited that they could not be of decisive value at this time.

In the meantime the battleship also has been improved. Its armor, its ability to withstand the shock of nearby exploding bombs, and its antiaircraft equipment have all been improved and strengthened. But the most effective of all defensive measures is the offensive use of pursuit aviation against the hostile air attack. Bombing airplanes are much more dependent upon their bases, ashore or afloat, than ships afloat.

The author admits that in narrow waters and in coastal regions aviation has more advantages than at sea, but he comes to the conclusion that any

country which would abandon its battleship construction at this time would be committing national suicide.

(2) SIEGFRIED-RÜCKZUG 1917. [The Siegfried withdrawal, 1917.] (II) Captain Drück

The second of a series of articles on the withdrawal in 1917 by the Germans to a newly prepared defensive line, for the purpose of shortening the battle front. The task of evacuation must have been tremendous. 135,530 inhabitants were transported to the rear in 341 railroad trains. 416 trains were used to salvage the railroad equipment in the area. 163 trains were used to move salvaged material. At the same time, 45,200 carloads of supplies and equipment were being moved into the area.

The Germans had a number of plans open to them: To fight rear guard actions, to delay in successive positions, to lay tactical traps, and to counterattack the advancing enemy, or to withdraw in one big move. The last plan was the one decided upon. In only one place was it planned to counterattack, and that was at Jussy, where the XVII Corps and 44th Reserve Division were to attack the enemy while he was astride the Crozat Canal. They attacked prematurely, when only three or four French battalions had crossed, and missed an opportunity for defeating a much larger force.

The French advanced cautiously, but even then, faster than the British. One reason for the delay in the British advance was that they immediately realized the strategic purpose of the German withdrawal, reduced the number of divisions in the sector, and even while advancing, were shifting part of their forces to offenses elsewhere. The Germans are very proud of the withdrawal. The expected loss of morale among the troops did not materialize because everything moved with such precision and orderliness, that the troops continued to have full confidence in the efficiency of their leaders.

(3) "KRIEGSERFAHRUNGEN"—"KRIEGSSPIEL." [War games and war experiences.] By "Pf"

Recent articles in this magazine have stressed the artificiality of war games and map maneuvers. In this article the author, by a concrete example in a map maneuver (two reinforced regiments opposing each other), indicates how pitfalls can be avoided.

(4) HINHALTENDER WIDERSTAND UND VERTEIDIGUNG FÜR BEGRENZTE ZEIT. [Delay in successive positions, and defense for a limited time.] (III)

This is the third of a series of articles on this subject, which seems highly controversial and important in German military circles. The author is in favor of the latter method for a number of reasons, some of which were given in previous articles.

Defense for a limited period is the form of action decided upon when the available forces are inadequate for a defense for an unlimited time period, or when a delay for a limited period fits into the scheme of the higher command.

A battalion of infantry occupies a front up to 3,000 yards in extent in terrain secure against tank attack. This is possible because all local reserves can be dispensed with, and highly mobile general reserves are made available.

Counterattacks are not normal, and only used in order to deceive the enemy as to the nature of the defense. Depth of the position is still desirable, but almost impossible. The lack of local reserves, the shortage of artillery, which is already overextended, make for a shallow position.

As opposed to a delay in successive positions (holding each position until the enemy has developed for coordinated attack), the engineers are not suballotted, but construct obstacles in front of the main line of resistance as a unit, and as soon as the enemy attacks, withdraw, and begin the same work on the next rearward position.

The withdrawal is usually planned to take place under cover of darkness.

These suggestions are made for the purpose of defining and clearing up the present tactical doctrine of delaying actions.

(5) AUSBILDUNG MIT WECHSELNDEM LEHRPERSONAL. [Training with changing personnel.]

The author presents a training scheme, for a typical morning's instruction of German recruits. Typical subjects for a morning's drill: (a) Taking advantage of the terrain; (b) Going into position in terrain providing good cover; (c) Target designation; (d) Surprise attack (by fire).

Instead of having one noncommissioned officer teach all four subjects to each section or squad, the author prefers the method of having one noncommissioned officer for each subject, repeating the instruction four times, as the sections rotate. This means better and more expert instruction, reduces the work of establishing many targets and other preparatory measures, keeps the recruits from standing around idle, and can be so designed that the noncommissioned officers do not become one-sided in their training, by a frequent rotation of instructors.

(6) DIE ZIELÜBERMITTLUNG BEI DER ZUSAMMENARBEIT ZWISCHEN INFANTERIE UND ARTILLERIE. [Target designation between infantry and their supporting artillery.] Lieutenant Lenhardt

An old prescription, but very simply explained, for using either panoramic sketches, or large scale maps with overlays for the numerical designation of aiming points. For example: Bush with bright green center to left of cornfield below church is No. 203; a lone tree just to right of road crossing is No. 204; etc. A target lying between any two of these points can be so designated as well.

(7) FUNKAUSRÜSTUNG IN DER ITALIENISCHEN ARMEE. [Radio equipment of the Italian Army.]

A brief resumé of the task the Italians had to face due to their backwardness during the war in development of this form of communications, the tremendous development in radio recently, and their new industrial reorganization. As a whole, the Abyssinian campaign called for more radio than the entire Italian army had ever had at one time. The equipment was quickly produced by its industry, and proved efficient and adequate, in spite of climatic and transportation difficulties.

(8) WEHRWIRTSCHAFT UND WAR BOOK. [Industrial mobilization and the British War Book.] Captain Ruprecht

"The War Book" is a secret British handbook on industrial mobilization. It is the result of the combined efforts of 29 cabinet members, 179 officers of the armed forces, 283 public officials, 11 representatives of the Dominions, and 30 representatives of industry and economists.

The book enunciates principles, its plan is flexible, and it plans for the assurance of the food supply, the maintenance of communications, and the protection against air raids, as well as plans for a continued and safeguarded supply of strategic raw materials. It covers matters of procurement, storage, and safekeeping of the industrial resources of the British Empire.

(9) GRUNDZÜGE DER TSCHECHISCHEN TRUPPENFÜHRUNG UND TAKTIK. [A brief summary of Czechoslovakian tactical principles.]

The Czechoslovakian army is based upon the corps, which consists of two or three divisions, heavy artillery, observation aviation, antitank and antiaircraft units, as well as supply establishments. Each corps also has a reconnaissance detachment. Although normally organized, each division is composed of four infantry regiments; only three regiment divisions have been used in recent maneuvers.

The cavalry is organized into brigades and is principally used for reconnaissance and security missions. It is normally reinforced by mechanized units.

Higher command operates according to carefully prepared staff procedure. The timely issuance of orders is emphasized. Warning and fragmentary orders are usual, to be followed later by the formal field order. In cases where daring chances are risked, mission type orders are used.

The employment of observation aviation, cavalry, and reconnaissance detachments agrees with the German doctrine. The Czechs also use reconnaissance detachments, when they have no other missions, as a mobile reserve.

The Czech soldier marches well. During the advance artillery is placed throughout the column as antitank measure, owing to the lack of an antitank

gun in this army. Great stress is laid upon the prompt report of the approach of hostile tanks.

The corps may advance with divisions abreast or in column, but each division requires a separate road. Corps troops are attached to one of the divisions for march purposes.

In the meeting engagement the advance is by bounds in order to always possess desirable terrain and to assure cooperation of all the arms. Only when the hostile advance has been stopped, is the attack prepared for, which usually is preceded by development.

Although the corps commander is not supposed to interfere in the struggle between the advance guards, he is supposed to be busy in the meantime forming a mass of maneuver for the coming attack.

In the defense the infantry battalion occupies a front of 1,000 to 1,500 yards, with a field of fire of from 600 to 1,000 yards. The defensive position has the usual main line of resistance, switch positions, and a rearward "receiving line."

Delaying action is considered the most difficult and is practiced a great deal.

Basically the tactics are French. They are sound, the Czechs well trained, and are led by capable officers.

12 March 1937

(9) BETRACHTUNGEN ZU DEM BUCH DES GENERALS DER INFANTERIE KRAUSZ: THEORIE UND PRAXIS IN DER KRIEGSKUNFT. [Theory versus practice in the art of war. A review of the recent book by General Krausz, Austrian Army.]* General Wetzell

Next to Conrad v.Hötzendorf, probably the most distinguished of the Austrian World War leaders is General von Krausz, who is also an authority on strategy and a well-known literary figure. In reviewing this book, General Wetzell had the double task of emphasizing those portions of the book which agree with the present German conception of strategy and history, and of minimizing and explaining away the differences in conception. Being written in German by an authoritative World War commander, this book will have a decided influence upon moulding German thought about military matters.

The following are some of the high points:

Neither Napoleon nor Moltke have left any "lessons" behind. These are all empty words until inspired by the will of the commander. Wars are caused by politics and political mistakes are paid for by the armed forces in blood. The doctrine of and desire for the annihilation of the enemy is the basic principle of all strategy. Ludendorff was the greatest German leader. Gneissenau, the real victor over Napoleon.

General Krausz believes that the Germans in 1914 could have effected a penetration between Verdun and Toul if they had had two hundred 305-mm mortars available. (These Austrian guns are the ones that brought about the decision at Liege.—TRANSLATOR.) He favors a strong right for the German advance, a withdrawal in the center and left. General Wetzell disagrees in that he states that the railroads could not have carried the additional load on the right, and that a French advance to the line: Treves—Saarbrücken would have been too risky. He also disagrees with General Krausz' criticism of the Moltke execution, reiterating that the delays incident to concentrating a second echelon behind the First Army would not have produced combat superiority at the decisive point on the Marne.

The greatest mistake of the Germans and Austrians was (both author and critic agree) the lack of coordination which led to Verdun and Asiago in 1916, instead of a joint offensive against Italy from the Tyrol.

The conclusion again emphasizes the spirit of annihilation.

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*This book is contained in the Command and General Staff School Library.

(10) FEUER UND BEWEGUNG BEIM PANZERANGRIFF. [Fire and movement during the tank attack.] Lieutenant Kauffmann

This young author proposes a radical variation from generally established tank doctrine. His theory is that tanks should halt occasionally; that they should practically always fire when standing still, because their fire while in motion is very inaccurate. For example, he states that as soon as a tank discovers an antitank gun (which it can usually do only by spotting the muzzle flash), the nearest tank should halt, and place accurate fire upon that antitank weapon until that weapon has been put out of commission.

A tank halted is just as big as a moving one. But the antitank gun has no more difficulty hitting a moving tank than a still one. On the other hand, the effectiveness of the tank weapons is tremendously increased.

The author argues against all standard objections to halting tanks, and concludes that the same principles apply to the tank attack that control the infantry advance.

Tanks should always halt when a hostile tank attack is met.

(11) GEDANKEN ZUR RESERVEOFFIZIERAUSBILDUNG. [Training of reserve officers.] Lieutenant Reitzel

The World War veterans who are still reserve officers are handicapped by their lack of familiarity with all the modern weapons and instruments, but on the other hand they know more about the effect of hostile fire than the subalterns of today. By teaching the reserve officers the new technique and at the same time taking advantage of their experiences in impressing these lessons on the troops and the younger officers, both trainer and trainee would profit.

(12) SPERREN. [Obstacles.] Colonel Tiemann

The employment of obstacles by the combined arms is not new. But new is the independent employment of engineers either alone or reinforced, for the purpose of solving combat problems by means of obstacle construction. At times special "Block units" (Sperrverbände) are organized. The usual form of order for their employment is: "The .....th Engineers will block the line A—B." Accordingly "blocking" is considered as a special form of combat. The conception of what these "blocks" consist varies considerably, however. Some believe that an insurmountable barrier is meant thereby; others, based upon the usual peace-time obstacle, that no appreciable delay is caused the enemy.

The directive: "The .....th Engineers will block the line A—B," leaves the decision as to how this is to be accomplished entirely to the engineer unit commander. Depending upon his interpretation of the situation, the enemy, and the terrain, he can merely furnish a counterreconnaissance screen, he can delay the enemy, or he can defend the position. Blocks are an engineer weapon just as much as small-arms fire is an infantry weapon, and just as the latter uses different methods of employing his fire, so there are different methods of employing this engineer weapon.

Just as one does not leave the decision as to the tactical methods to be employed to the infantry battalion commander, so the engineer battalion commander also should be told what is expected of him tactically.

The order should therefore be: "The .....th Engineers will furnish counterreconnaissance along the line A—B," or "The .....th Engineers will delay the advance of mechanized hostile units along the line A—B."

Road blocks delay only those units which are tied down to roads. Infantry, cavalry, and cross-country vehicles are not delayed at all. But even infantry and others capable of cross-country mobility can be delayed by such blocks, by being forced to march off the road for considerable distances. The more the blocking of roads extends in depth, the more will the delay be effected. Blocks located at points where they can not be detoured, such as in dense woods, bridges, etc., can accomplish considerable delay by forcing the enemy to use other routes, or to remove the road block.

Terrain obstacles are effective against all arms. Their construction on the other hand requires a considerable amount of time, matériel, and personnel. For that reason they are only used at points where their employment will be profitable—that is, tactically, in the delaying or the defensive action.

All obstacles, other than wire, create hesitation on the part of the enemy by their mere presence. The degree of delay can be heightened if they also are under fire. Wire entanglements that are not under fire, do not cause any appreciable delay to the enemy.

Counterreconnaissance or screening can in general be effected by engineers only against road bound vehicles. It is necessary to block all roads and paths crossing the counterreconnaissance line. The blocking of crossings over large watercourses can completely prevent ground reconnaissance or at least make it very difficult.

The delay of the advancing enemy can be accomplished by the engineers by means of road blocks. If possible, these should extend in depth. The greater the depth of the obstacle zone, the greater the delay caused thereby. Frequently it is of distinct advantage to make the utilization of one or more designated roads difficult or impossible for the enemy.

In assisting a delaying position, the principle in general is that the obstacle need not be any closer to the defensive line than it is intended to let the enemy advance. For that reason wire obstacles are useless in this form of combat. Depending upon whether the emphasis is placed upon the withdrawal or the obstinate defense, obstacles may either be concentrated along the roads leading up to the position, or the terrain features whose blocking will aid the defensive battle. Thus there might be tank obstacles, blocking of the infantry attack, making observation points, assembly positions, emplacements for machine guns, trench mortars, or artillery, as well as the avenues of approach leading to them, difficult to occupy.

In the defense, there are in addition to the above, those obstacles which increase the defensive power of the main line of resistance, such as tank traps and obstacles, wire in front of the main defensive position, etc., all of decisive importance.

Depending upon the terrain and the intended scheme of defensive fires, these obstacles will either be more toward the enemy or close to the actual main line of resistance.

In the withdrawal the same operations as indicated for delaying action apply.

Large scale obstacle projects may simulate the presence of troops, which in reality are missing.

Obstacles are a two-edged combat means. With a change in the tactical situation they may operate to the disadvantage of the side that erected them. Particularly fatal may be hidden mine fields. Their effect may be either on tactics or on morale. As soon as the situation is known to the commander, he can adjust himself to the tactical situation. The moral effect is more difficult to gauge. Troops that once have had losses from friendly obstacles (mines) will be unwilling to attack thereafter over terrain which has been fought over by one's own troops previously.

In order to avoid all these obvious disadvantages the following principles are considered applicable:

(a) Large scale road blocks require authority from higher headquarters.

(b) Mines should not be scattered all over the terrain, but kept together in the form of mine fields. The location of these fields should be indicated in orders.

(c) The construction of mine fields is the prerogative of but a single arm, the engineers. Every engineer officer must consider it his duty to report the exact location of all camouflaged mine fields to higher headquarters. It is the duty of the army to inform all subordinate as well as newly arriving units of the exact location of these mine fields.

(13) DAS PROBLEM DER LUFTSPERREN IM AUSLAND. [The problem of aerial barriers.] Colonel Nagel

Based upon the successful use of balloon barriers in Venice, Brindisi, Pola, London, Paris, and Nancy, during the World War, many countries have plans for the use of stationary balloon barriers around their vital cities and establishments. In general there are kites and balloons available. Both have their advantages and disadvantages. In some only the ground cable is the obstacle; in others the balloons are interconnected and also suspend nets. The use of balloons in tandem has its advantage.

The latest French barrier balloons are said to reach 18,000 feet and their mere presence forces bombers to fly so high that their bombing accuracy is nullified. France tends toward the small balloon in tandem, whereas Great Britain and the United States favor large balloons sustaining nets. They are used only at night. In daytime pursuit aviation and the antiaircraft artillery furnish protection.

In most countries the organization responsible for the erection and maintenance of these barriers is under the antiaircraft artillery.

Usually there are not enough balloons available for an all-around defense, so it is the usual practice to arrange them in depth in the direction from which the hostile attack is expected.

(14) DIE VORMILITÄRISCHE ERZIEHUNG DER TÜRKISCHEN JUGEND. [Pre-military education of Turkish youth.]

A very enthusiastic account of "Askerlik," the Turkish name for military sport and mental preparedness. It is favorably compared with the Italian Ballila and the part that the author likes the best is the fact that it is under the complete guidance of officers of the army.

(15) ELEKTRIFIZIERUNG DER ITALIENISCHEN EISENBAHNEN. [Electrification of the Italian railroads.]

A brief article on the strategic importance of the electrification and double tracking of the line: Bologna—Florence—Rome, as well as the completion of all roads leading from the plains of the Po to the French, Swiss, Austrian, and Yugoslavian border.

(16) MOTORISIERUNG UND NACHRICHTENWESEN. [Communications and motorization.] Lieutenant Sadrozinski

Motorization has brought about new conceptions as to communications. This article confines itself, however, merely to an infantry regiment.

The telephone can not be used during the advance. But as soon as the regiment has detrucked it is useful. It requires complete construction from regimental headquarters to battalion headquarters. Road crossings must be buried deep. Heavy cable is preferable to field wire.

Signal lamps are impracticable during the advance. They are usually worthless in the attack, but in defensive situations they may prove very valuable. The permanent assignment of lamp operators in the regimental communications set up is not advisable. On the other hand one or two signal lamps should be furnished for communication with neighboring units, etc.

Messenger dogs appear at first glance to be superfluous. The distances between regimental and battalion headquarters are too great, and can usually be covered more efficiently by a motorcycle messenger. But from the battalion to the companies they are very useful. Bringing them up with motors spares them and leaves them fresh for duty.

Radio is the only means usable during the advance. However, it is subject to mutual interference, and in view of the fact that motorized units are dependent upon surprise for effect, may give that away.

Two types are necessary. One, with considerable range, for communition by voice during the march and for rearward communications, and another of preferably short range, for use during the attack. If direct communication between division and regiment is desired, then the division should attach a suitable set. Sets without quartz are preferable so as to permit rapid change of wave length. Reduce number of wave lengths by carrying on all business on a single frequency. Use of neighboring staffs may save some instruments.

Pigeons are one-way communications, and require several days for orientation. Light or black light (infra-red) telephone systems require visual contact and has not as yet been developed adequately for front-line use. Increased importance of aviation and pick up message systems.

The composition of the regimental communications unit should allow for action during the march as well as in battle. The amount of telephone wire can hardly be reduced; 6,000 to 8,000 yards of field telephone wire on cross-country vehicles is necessary. A vehicle for carrying wire to supply the battalions is also necessary. A second regimental switchboard for forward displacement is desirable.

The regiment requires three, and each battalion two radio sets. Radio detachments should be grouped to reduce the number of vehicles and cut down the length of the motor column. Signal lamps should be taken along, for use in favorable terrain. The battalion detachment should have a group of dogs.

Communication between advance guard and main body will be mostly by motorcycle messenger, only in exceptional cases (tank warning, sudden change of direction, etc.) should radio be used. Wires simply can not be laid at the rate of advance of a motorized unit.

Signal units will, as a result of increased mobility, be able to facilitate the frequent advance of command posts to a much higher degree than they formerly were able to. The principles as their establishment remain the same.

Wire will be used only after detrucking and after the situation has been cleared up; until then, radio. Secrecy as heretofore.

As soon as the companies begin to detruck for action, there should be no delay in laying wire. Change of scheme of maneuver can be followed readily, but the signal unit must be kept in hand. As soon as a section has completed its task, it must report back immediately, in order to be available for renewed employment. The signal unit must be committed so as to enable it to take advantage of the terrain and be moved as far forward as possible by motors, in order not to lose contact with the advancing units.

19 March 1937

(17) DIE FORMEN DES UBOOTKRIEGES. [Types of submarine warfare.] Admiral Spindler, Retired

It is questionable if public interest can still be aroused by a discussion of the German submarine warfare of 1914-1918. Since then technical advancement has created an entirely new situation, and as to their employment, new international conventions are applicable. So why bother with the details of these events which belong to the past, and about which only a select inner circle knew the exact truth?

On the other hand it may be of considerable value to be intimately familiar with the details connected with submarine warfare because these affected not only the immediate naval program, but commercial struggles, statesmanship, and even to some extent the conduct of land warfare. The problem presented was to find a method of employing the submarine which took full advantage of its technical capabilities, and at the same time provided a satisfactory political solution.

In order to fully understand the problem of submarine warfare, the relation between international politics and military requirements, in order to be able to discuss some other solution than the one adopted, a full and clear conception of the character of submarine warfare is essential.

The German Official History of Naval Warfare, published by the archives division of the German Navy Department, has so far covered up to and including 2 January 1917, the date on which any differences of opinion as to submarine warfare were dissipated within the German Navy. The historical facts are presented in this publication, and all that one would care to know on the subject is contained therein. In spite of that fact there are constantly appearing articles which discuss the submarine campaign and are full of erroneous statements.

Two recent articles of that nature are the cause for this dissertation. In the 5 February 1937 issue of the "Militär-Wochenblatt," Captain Waldeyer Hartz (German Navy) wrote an article on "Humane Submarine Warfare" and propounded the theorem that the arming of hostile merchantmen was the cause for the increased severity of the German submarines. He stated that the submarine warfare began in accordance with the international rules of seizure and search, but that the arming of merchantmen made such a humane procedure impossible, forced the unrestricted form of submarine warfare, and finally resulted in the sinking of merchant vessels without warning.

In the January 1937 issue of the "Militärwissenschaftliche Rundschau," published by the German War Department, Admiral Bauer wrote a study

on "The German Submarine in the World War." This author is of the opinion that in February 1915 the original intention was to carry on unrestricted warfare in British waters, that is to sink hostile as well as neutral merchantmen without warning in the war zone. Even though the published order of the Admiralty on 4 February 1915 was not quite clear as to the procedure toward neutrals, there had been no doubt as to what was meant—unrestricted warfare—on the part of the fleet. He stated that as a result of neutral protests the "weak" German government then withdrew from its position and ordered greater caution in handling neutrals, resulting in a nullification of the blockade around England.

Two views are represented in these articles. One is that submarine warfare began in the mildest possible form, in accordance with international law, and the other that submarine warfare began with the most aggressive and unrestricted policy, with the planned sinking of all ships, hostile as well as neutral, merchant or war, without warning. Only political considerations prevented the execution of the plan.

Both these views are contradictory. Neither of them is correct.

The German blockade announcement of 4 February 1915 and the accompanying note of the German government clearly indicated that submarine attacks were only planned against hostile vessels, and that "German naval forces have been instructed to avoid any violation of neutral shipping, in so far as it can be recognized as such." The German admiralty was convinced at that time that the merchantmen of the Entente would in a very short time be sailing under neutral colors, and that neutral and hostile ships would be difficult to tell apart. Furthermore, it was not believed that submarines should be expected to carry out careful search in order to determine the proper or improper use of neutral flags, inasmuch as it was definitely expected that these merchantmen would be armed and capable of offensive action and other resistance against submarine control. The erroneous sinking of neutral merchant ships would therefore appear inevitable. But intentional destruction of neutral shipping—this characteristic of unrestricted submarine warfare—was never even considered throughout the conferences between the Navy Department, the Foreign Office, and the Chancellor (November 1914-February 1915). When the government launched itself into the unknown sea of submarine warfare it did so with the understanding that everything possible would be done from a naval viewpoint to prevent the sinking of neutral shipping except as an unavoidable accident. If Admiral Bauer, who at that time was in command of submarine activities, had other ideas as to the intent of the governmental policy, then such a mistaken conception is the fault of the Admiralty itself. But all these details, including the attitude of Admiral von Pohl, are fully explained in the work of the Naval Archives, and there should be no question as to facts. In 1915, unrestricted submarine warfare was not planned, but on the other hand it was planned to sink hostile merchant ships without warning, and to proceed against neutral ones in accord with existing international law.

As previously indicated, the opening phases of the submarine campaign in 1915 were groping into an unknown sphere. There were certain suppositions as to what the enemy might do. Only the actual course of events would indicate what he really would do, and how to proceed further.

Immediately upon the very first venture, the initial experience, corroborated as time went on again and again, and more and more emphatically, the fact that all these suppositions had been erroneous. A misuse of flags was practically non-existant. Hostile merchantmen were readily discernible by the fact that they carried no flags, had painted over all names, and when challenged, always sought safety in flight. Neutral ships were recognized by the fact that they carried their national flag, bore other plain markings, and usually complied readily with the orders of the submarine commanders. Furthermore, hostile steamers were not armed for several months.

The result of these unexpected developments was that submarine commanders began to use their guns more and more, that is, to operate on the surface, and to avoid using the difficult underwater torpedo. The gun was far more effective in the campaign against merchant ships, much quicker,

and the risks connected therewith were far less than had been assumed, at least for several months. Also the danger of submarine traps, which were quickly recognized after their initial surprise effect, had been exaggerated.

Therefore, the methods of submarine warfare were adapted to the situation. This was not the situation anticipated, and throughout the summer of 1915 it developed smoothly into submarine warfare in accordance with international law.

All that was necessary at that time was to confirm this status by means of an official order. The diplomatic advantages of such an order can hardly be overestimated. This type of submarine warfare complied with the laws of seizure and search; there was no sinking of ships without warning, and it complied with all diplomatic demands. Even the fundamental understanding with the United States would have been possible. The last "Lusitania Note" of 21 July 1915, indicated unmistakably such a solution. A great opportunity was permitted to pass by. It was so because the German government at that time lacked understanding, unity, and strength necessary to coordinate the military and diplomatic features and to guide them both with a strong and determined hand.

Instead there was only internal conflict. Submarine warfare was entirely suspended in English waters for almost a whole year, with the exception of a short period of activity in the spring of 1916.

The results in sinkings between October 1916 and January 1917, at which time the German submarines operated in accordance with international law, by Navy Department orders, and by which time the situation with regard to the arming of merchantmen had been completely altered, indicate that very decisive results could have been obtained after the summer of 1915, if the submarine campaign would have been continued, and conducted in accordance with international law.

After the merchant ships of the Entente had been armed, that is in general around 1 January 1916, the effectiveness of submarine warfare was considerably reduced as long as they complied with the laws as to seizure and search. The German government announced in February 1916 that armed merchant ships would thereafter be treated the same as war vessels, that is, attacked without warning.

This phase of the German submarine warfare, however, also ran a most unhappy course. Immediately after the published order with reference to armed merchantmen went into effect, a secret order was published which meant a return to the procedure of the summer of 1915—in other words, the sinking of all hostile ships in the war zone without warning, even the unarmed ones. In accordance with this order the unarmed French passenger ship "Sussex" was erroneously torpedoed on 24 March 1916. This was followed by the sharp American ultimatum of 18 April 1916, and thereupon again the cessation of submarine warfare against England. The German interpretation of international law, of declaring all armed merchant ships as being classified as ships of war, was never argued out and brought to a decision.

By strange coincidence the American government expressed the idea that submarines, whose employment in the campaign against merchant ships was acknowledged, could not be expected to proceed against merchantmen by halting them and searching them, if they were armed, at the same time that the German government was proposing just such a suggestion. A follow-up of the German proposal would have therefore found encouragement in the United States. To what extent the American government was committed against the principle of arming merchantmen may be gathered from the fact that when a submarine torpedoed the armed British passenger steamer "Persia" on 30 December 1915, with a loss of 334 lives, among them two Americans, no protest was made by the American government. But on the other hand when the unarmed "Sussex" was torpedoed, the above mentioned ultimatum was presented, although no American lives were lost thereby, and the only thing that happened was that several American passengers were injured. There were also other indications which pointed to the expectation that the American government would consider the German viewpoint as to the treatment of armed hostile merchant ships.

The military results would have been excellent. We would have been able to conduct what would amount to unrestricted submarine warfare, without being forced to enunciate that dangerous phrase. Against unarmed ships, and against all neutral vessels, the procedure was to be according to international regulations; hostile armed ships could be torpedoed without warning. Unrestricted submarine warfare as practiced in 1917 and 1918 was not much different in practice. Even while engaged in unrestricted submarine warfare, experienced submarine commanders used their surface weapons as much as possible, in order to achieve the greatest possible economy of ammunition and effectiveness; the difficult torpedo was only used when there was no other choice, or when there was a favorable opportunity for using them against large valuable steamers, which were always heavily armed, secured by accompanying warships, or travelling in convoy.

The argument will now be propounded that convoys, after the fall of 1917, were the most important objectives in the Atlantic. A submarine complying with the regulations as to seizure and search cannot halt a vessel in convoy. Convoys could only be attacked by submarines because we claimed the right to do so in the blockade zone as a reprisal.

The answer to this argument is that the classification of vessels, hostile as well as neutral, sailing in hostile waters, as well as their treatment by submarines, is a question of international law, which has never been settled any more than the problem of the armed merchant vessel. However, with the same legal right, by which the German government denied the privileges of merchant vessels to those which were armed, and classifying them as ships of war, the German government could have announced that it would consider all vessels under armed convoy in the same category. It is to be assumed that when a neutral vessel places itself under the armed protection of one of the belligerents, that it is planning on resisting search by the other side. The German government therefore should have announced at the appropriate moment, that it would consider all vessels, even neutral ones, sailing under armed convoy of the enemy, in the same category as armed vessels of all sorts.

The argument briefly outlined above may be summarized as follows:

Procedure according to the laws of seizure and search should have been the basis and the starting point for the conduct of the submarine warfare. The arming of merchantmen and the movement in convoy should have been treated as exceptions to the general rule. So, by gradual expansion of existing law, and by means of logical adaptation to the changing situation, the submarine campaign would have arrived step by step at a point, which would have approximated unrestricted warfare. The complaints of interference with neutral trade would have been voiced in an entirely different tone. The necessity of applying the right of reprisals, which in its very essence acknowledges illegality, would then have been unnecessary. Furthermore, it appears to me that the published restriction of large sea areas which was received by the entire world, especially by the United States, as a challenge, would have been unnecessary. The initiation of a submarine campaign proceeding in accordance with international law requires no announcement either for military, legal, or diplomatic reasons. The special treatment of armed ships and convoys does not have to be restricted to certain sea areas; it can be applied everywhere with the same legality. Consider, for example, that the United States used the harsh words of "strict accountability" when the original restricted zone was announced by Germany in 1915, and emphasized its position, so that when on 31 January 1917 the unrestricted submarine warfare was announced, after all that had preceded this event, the entry of that country into the war was inevitable. It merely indicates how the course of events might have been guided by a clever evaluation of foreign psychology, in the careful choice of phrases, and the sound, legal progression to stricter forms of submarine warfare.

The possibility of a satisfactory settlement with America was clearly indicated. Opinions may differ as to the chances of success along those lines. This much, however, is certain: The immensity of the objective warranted at least an attempt.

These considerations can not be concluded without briefly discussing the frequently advanced theory that the entry of the United States into the war was caused by economic pressure and not by the submarine situation, and for that reason any discussion about it was beside the point. Even Admiral Bauer in his article favors such a hypothesis, and bases his opinion on newspaper articles of the report of the American Senate Munitions Committee of 1936, as well as certain statements made by President Wilson in 1919 when in answer to senatorial questions, he supposedly indicated that America would have entered the war even without the submarine question being an issue.

As to the latter argument, Admiral Bauer apparently did not have original sources available to him, any more than for the first statement. As to the statements of President Wilson, he did say, when cornered in regard to the League of Nations, that in his opinion public sentiment in America had sufficiently condemned the "Injustice of the German War," to have brought the United States into the conflict, even if it had not been directly affected by it. In this connection it is necessary to state that the "Injustice of the German War" was based largely, in American eyes, upon the activities of the German submarines. Also the context of President Wilson's testimony indicates that he had no intention of denying the influence of the submarine warfare on America's attitude.

A similar case can be made of the Munitions Committee of the American Senate, the Nye Committee. The final report of this committee, 1-16 June 1936, a report of splendid thoroughness, presents in the original an entirely different picture than one gathers from press notices. The interrogation of the representatives of J.P. Morgan and Company, indicated that the financial and business interests exercised noticeable effect upon American policy during the war in a pro-Ally and anti-German sense. That is nothing new. In the spring of 1916 the German ambassador already reported as much. But the Nye committee, hungrily searching for just such evidence, was unable to find a shred, indicating that J.P. Morgan and Company, or any similar interests, used, or even tried to use, their influence on either the President or Congress towards America's actual participation in the War.

America's entry into the war was the combined result of a number of factors. None of the factors, by itself alone, would have been sufficient to have forced America into the war. The strongest factor, however, and the one that gave the immediate cause, was the submarine war.

These brief remarks on the very extensive question of America's entry into the World War were added to this article in order to indicate that such arguments do not in the least affect the validity of this discussion of the submarine in war.

As initially stated, a study of the submarine campaign is a field of particular value in considering the coordination of military and diplomatic phases in war. It would not be advisable to use other than the purest of scientific bases for such a study.

(18) DAS PROBLEM "STELLUNGSKRIEG." [The problem of position warfare.] Major General Klingbeil

The author states that position warfare is nothing new in history. It is primarily a strategic decision, and only secondarily a tactical phenomenon. It is not the result of the immobility of the enormous masses of armies, because the operations in Rumania, Russia, Serbia and Italy prove otherwise.

It is the result of the tremendous defensive power of modern weapons, and the strong will power of entire people, which nowadays is willing to hold out to the very last.

What of the future? Future wars will not be wars between "Cabinets," but, like the World War, struggles between entire nations. It is too early to state that aviation and tanks will determine the future war, but most authorities agree that position warfare will come again, at least along part of the frontiers, where a nation chooses a defensive attitude.

(19) TAKTIK DER INFANTERIEGESCHÜTZE. [Tactics of infantry cannon.]

A constructive criticism of the current German regulations for Minenwerfer and 37-mm guns. The author considers the infantry cannon as the real accompanying gun, and has taken over the mission, which in the early

days of the World War the machine gun had to fulfill. In close terrain they should be employed singly, in commanding terrain, by platoons.

(20) DIE VERWUNDBARKEIT VON LUFTSCHIFFEN. [The vulnerability of dirigibles.]

An extract from an article appearing in the British "Army, Navy and Air Force Gazette." The author concludes that they are not as vulnerable as is generally supposed. Of nine attacks on Zeppelins in the Channel, only two were successful. A dirigible can climb 20,000 feet in five minutes, which no plane can do. It can hide in the clouds, and let down an observer basket. It can be protected by its own pursuit.

(21) VOM SPANISCHEN KRIEG. [The Spanish War.] Colonel v.Xylander

(22) TECHNISCHER RUNDBLICK. [Technical review.] Colonel Blümner

A brief summary of recent technical advancement. Great interest is shown by the author in American development. He discusses the M-2 mount for the 75, also experiments with the 2" mortar (grenade thrower). He gives the present status for the reduction of flash. In Germany they are using a mixture of two parts dinitromethoxyethoxyquinolnitrate of potash and one part of TNT.

In Russia great emphasis is placed upon aviation spraying an incendiary liquid on villages, forests, and assembly areas. Great Britain has developed automatic sprinklers for airplanes.

General Motors has developed a motor energized by light rays.

(23) DIE KRIEGSGEFANGENEN NACH DEM VÖLKERRECHT. [The international rules of land warfare as affecting prisoners of war.] Dr. Walbrach

A brief discussion of the present status on this subject. The new Geneva convention of 1929 has many desirable features the old law of 1907 lacked. There are new special provisions for female prisoners of war. Release on parole has been abolished. Reprisals are prohibited. Prisoners of war must be kept in an equable climate, not sent to cities exposed to bombardment, nor kept near the front. (World War experiences.) Special agreements between belligerents are authorized.

A prisoner of war has the moral right to seek escape. Attempts are subject to disciplinary measures. Successful fugitives may not be punished on recapture, for escaping from a previous capture.

The author concludes with the statement that this is all very good, provided the belligerent nations live up to the spirit and letter of the new conception.

(24) SOWJETGRUNDSÄTZE FÜR DIE VERWENDUNG VON TANKS IN DER VERTEIDIGUNG UND BEI NACHT. [Russian principles for the employment of tanks in the defense and at night.] Major Zölsz

According to Soviet tactical doctrine there are three general types of defensive operations: (a) Defense with a normal frontage; (b) Defense on a broad front; (c) Mobile defense.

In the second type there will be gaps up to 2,000 yards in width, but covered by fire.

The employment of tanks in types (b) and (c) is definitely prescribed in Russian regulations. Normally tanks are assigned to the reserve for purposes of counterattacks. At times, if there is a surplus of tanks, they may be attached to individual battalions.

In the defense with normal frontage a battalion of tanks will be assigned to each division. They will be employed wherever the defender plans on making an advance. They may also be used in front of the position to meet the enemy. Reconnaissance detachments and outposts will always be reinforced with tanks. Russian regulations consider two classes of outguards. Battalions or companies are called "strong"; platoons are called "weak." In the case of "strong" outguards the attachment of tanks (at least a platoon) is often advisable. They have the mission of meeting the hostile reconnaissance and security detachments with surprise fire; they delay the hostile advance guards, and force the main body to an early development. Finally, tanks can screen an eventual withdrawal.

The most favorable opportunity for the destruction of hostile forces is when the enemy is assembling in advanced positions for the attack. Infantry, machine guns, infantry cannon, liaison parties, staffs, observers, com-

munications personnel, are all together and at that time they usually lack organized antitank defenses. A tank attack may prove disastrous to the enemy at this time. The attack can be executed either night or day, but best at dawn. All available tanks should be committed. Tanks of course will strike mine fields, the hostile artillery, and their tanks. If the enemy has more heavily armed tanks this may prove dangerous. If the assembly position of the hostile tanks is known, a detachment of our tanks should be detailed to combat these.

If an infantry division with normal frontage has a tank battalion available the latter should be used in two waves. The first wave, one company, attacks the hostile front line, their machine guns and observers, and penetrates to a depth of about 1,000 yards. The second wave consists of two companies of tanks, and the battalion and regimental reserves, and attack to a depth of about 1,200 yards. The direction to be taken by the tanks must be well reconnoitered, and should be safe-guarded on its interior flank by means of mine fields. If a withdrawal of tanks is planned, this must be covered by an artillery barrage.

There are two schools of thought as to the employment of tanks in the defensive position. One school of thought wants to attach the tanks to the front-line units. The others want to assign them to sector commanders to be used in counterattacks. In the former case, defensive frontages can be increased, and prompt local counterattacks by tank platoons are possible. However, this results in a dispersion of forces and is only advisable when there is a large number of tanks available.

If the sector commander is given tanks he will use them by companies, with or without supporting infantry, to attack the hostile advance in front of the position, and strike them in flank. Counterattacks are usually launched from the extreme flank. If the enemy has been stopped, all available tanks should be used in the counteroffensive. Routes for sallies must be prepared in advance. Assembly areas must not be where the hostile artillery can readily interdict them. If the enemy has tanks then our tanks attack their infantry as they detach themselves from their tanks. Attacks downhill are favored. If the tanks reach the infantry quickly they are reasonably secure from antitank weapons. At times tanks can be used stationary, to bring hostile tanks to a halt, but especially to hold ground until the infantry can come up. If the enemy has heavier and better armed tanks, tank attacks can only be executed if their flanks are secured by means of mine fields.

From these considerations we can clearly see that even the attacker must never neglect to provide antitank defenses, from the beginning of the reconnaissance phase, throughout the entire development phase, and during the attack itself.

Some Russian writers are also proposing night attacks by tanks in order to penetrate the hostile defensive line, and to permit the infantry, attacking at daylight to make an unobstructed advance. The attack must be so timed that the infantry will be able to occupy the breach in the hostile position before dawn. The night attack by tanks only advances as far as the hostile artillery and has for its sole purpose the reduction of casualties. At daybreak a second thrust is made deeper into the hostile position. The decisive action follows in daylight. Only well trained and highly disciplined units can of course be used for night attacks.

26 March 1937

(25) DER EINZELKÄMPFER MIT GEWEHR IM MODERNEN GEFECHT. [The individual combatant with the rifle in modern war.] Lieut.Colonel Badinski

A plea for better marksmanship training in the German Army. The argument is based on the expected open warfare situation, where the individual may still have an opportunity to use his rifle instead of merely becoming a hand grenade thrower. The very emptiness of the battlefield calls for marksmen of high quality. The author deplores "snap-shooting," stating that it ruins good shots. The principles enunciated and the training recommended are very similar to that in use in the United States.

(26) WERDEN UNSERE SPÄHTRUPPS RICHTIG AUSGEBILDET? [Is patrolling being properly taught?] Major Gleiniger

This article goes into considerable detail in the apparent conflicts between training regulations as to the conduct of reconnaissance patrols. He tells of finding in maneuvers a mounted patrol of twelve men hiding from a hostile patrol of four men, "because their mission was to reconnoiter, and not to fight." The author says this is all nonsense. Even if patrols are not on counterreconnaissance missions, they should, whenever possible, establish their superiority in the terrain between the opposing forces in order to force the enemy to use large patrols, and therefore fewer ones.

(27) FORDERUNGEN DES INFANTERIE-NACHRICHTENDIENSTES. [Demands on modern infantry communications.] Lieutenant Knüttel

A plea for the motorization of the German regimental communications.

(28) ZUM THEMA "SPERRVERBAND." ["Block" organizations.] Captain Koch

"Block" (German—"Sperr") units, specially designated to render certain terrain impassable (or passable with difficulty) to the enemy are an established German type of tank organization. In the present article the author recommends that a distinction be made between an "obstacle line" and an "obstacle zone." The former to delay the enemy for limited time only; the latter, organized in depth for an extended delay, lasting possibly several days.

(29) BETRACHTUNGEN ZU DEM BUCHE VON OBERSTDIVISIONÄR BIRCHER UND W. BODE: "SCHLIEFFEN. MANN UND IDEE." [A review of "Schlieffen as a Man and as an Idea," by Generals Bircher and Bode, Swiss Army.] General Wetzell

A critical review of this book by Germany's outstanding strategist. The reviewer criticizes the book whenever its author does not follow within the accepted German ideas. These are today: That the Moltke modifications of the German War Plan were sound, that the loss of the Marne Campaign in 1914 was due entirely to lack of control by general headquarters, failure to furnish enemy information, and the resultant initiative and disobedience of the army commanders.

The idea, however, that Schlieffen represented a fixed strategic formula rather than an elastic conception, is also emphasized by the reviewer.

(30) VOM SPANISCHEN KRIEG. [The Spanish War.] Colonel v.Xylander

(31) DIE ÖSTERREICHISCHE ARTILLERIE. [The Austrian artillery.]

A brief account of the present armament of the Austrian army in artillery. In view of the mountainous nature of much of that country all artillery of the division calibers can be broken down to pack loads. During the past year the number of batteries has been tripled. Their ultimate armament will consist of 79 batteries, of which 34 will be motorized.

(32) VERLADEÜBUNGEN MIT REKRUTEN. [Practice entrainment with recruits.]

A plea to hold practice entrainment and entrucking exercises for the cavalry and other mounted branches.

2 April 1937

(33) DER OFFIZIER UND DAS MILITÄRISCHE SCHRIFTTUM. [The officer and military literature.]

A plea for more time in which to study current military literature and history. The author claims that when the mental fatigue point is reached in daily routine, officers will not be able to absorb any theoretical knowledge and are too tired to study. This also applies to social activities, which in the opinion of the author, take up too much of the officers' time.

(34) GRAF BOTHMERS ANSICHT ÜBER DEN DEUTSCHEN GENERALSTAB. [Graf Bothmer's views on the German General Staff.]

As a subordinate of the late Count Bothmer during the World War, the editor of the "Wochenblatt" was much impressed by a letter recently placed at his disposal. In spite of its brevity it presents not only a clear picture of a real army commander, but also of the training of the German General

Staff, and the cooperation found in higher staffs. Because of its historical value, this letter appears to be worth publishing:

23 December 1931

. . . Until now, no one has had as clear a picture as you of my collaboration with my army chief of staff, who was intellectually and emotionally my opposite. This relation has been frequently wondered at; at times even ridiculed. But I have to expand your remarks to include my entire staff, among whom no two were alike, or even similar. . .

Each one had different ideas as to the meaning of life as well as about military matters. Imagine our conversations about fame and immortality! Think back to the day, or rather the night of Zurawno, when it was a question of holding the bitterly fought for bridgehead over the Dniestr, thereby running the risk of exposing the entire 3d Guard Division to complete annihilation. Later on I discovered that every one of us had considered some other solution a better one. After my decision was announced, the entire staff worked just as if they each and every one had held the same opinion initially. But that was not the really big thing. That was, that the harmony in my staff was never disturbed.

How was this achieved? We need not for a moment imagine that this was the result of our personal efforts. It was the training and education of our staff, which went far beyond purely professional matters. It did not regiment its members to an intellectual and moral uniformity; it did not try to break down their individuality. But it did manage to take strong characters and bring them first of all to supplement each other, then later to harmonize them into a single unit. The accomplishment of this was much more difficult of achievement than all tactical and strategic training, all training in conscientiousness, willingness to take on responsibility, and the will to work, no matter how highly these qualities may be evaluated. . .

(35) Die Rolle einer veralteten, aufgelassenen französischen Festung im Bewegungskriege 1914. [The importance of an old neglected fortress during the advance to the Marne in 1914.] General v.Berendt

On 27 August the German Second Army had reached the line north of Bohain—La Capelle. On the following day the pursuit was to be continued with the left flank held back. The right flank was given the mission of attacking the fortress La Fere. The 19th Reserve Division (X Reserve Corps) and the 19th Division (X Corps) were to advance astride the Oise within range of the forts to the line: Urvillers—Villers le Sec, so as to open the attack on the 29th. The remainder of the army: VII Corps, X Reserve Corps (less 19th Reserve Division), X Corps (less 19th Division) and the Guard Corps, were to be kept in readiness to the right and left. All the heavy artillery of the army was attached to the two assault divisions.

According to available maps, 1:300,000, La Fere was only a small armed point. The Oise, the Serre and the Crozat Canal met there, as well as a number of railroads and roads. This fortress was therefore strategically important. The city itself was protected by walls. Three advanced forts from two and one-half to four miles out were an advanced protection. Nothing was known as to garrison or field fortifications. Quite a few airplanes had been sent on reconnaissance, but apparently none received the mission of taking a look at the fortress. The Cavalry Corps, located in front of the right flank of the army, was not asked to reconnoiter the fortress. In accordance with peace time regulations, officers' patrols from the heavy artillery and the engineers were to be assigned this task. The First Army had informed them, that based on the personal knowledge of their chief of staff, the fortress had been abandoned and probably was not even armed.

This small fortress played an important role in the minds of the Second Army during the next few days. Nothing came of the immediate attack.

The plans of the Second Army were upset by the enemy. The French Fifth Army, which had been withdrawing, made a surprise attack towards the west and north along the Oise sector: Etreaupont—Guise—La Fere.

After three days of hard fighting it was finally possible to drive the enemy back on 30 August. La Fere remained in threatening proximity to the right flank of the Second Army.

On the extreme right flank of the Second Army the 14th Division had already reached Ham on the Somme, when it was called to the Oise by an army order. The Chief of Staff of the VII Corps, Colonel Wolff, suggested that the order be disobeyed, but to move the division at night south of La Fere across the Serre against the rear of the French. This was a very promising suggestion, but the Corps Commander felt that in view of the army order, he could not very well execute such a move. Colonel v.Wolff estimated the importance of the fortress as being but minor.

The most southerly fighting unit was the 77th Infantry which was 3,000 yards from the line of forts. It had not used its supporting artillery. The regimental commander refused, however, to follow the retreating enemy, who had sought refuge in the line of forts.

Headquarters, Second Army wanted to turn the "ordinary" victory west of the Oise into a "Cannae." The fortress, however, was in the way. Army headquarters therefore decided first of all to settle with the fortress and to slow down the general pursuit by giving all troops not actively engaged in attacking the fortress (2 divisions) a day of rest. Special security measures against the line of forts were ordered. The Cavalry Corps was given as their principal mission the closing off of the southwest line of forts.

During the previous battles, the frequent appearance of heavy artillery was noted, and was always referred to as "fortress artillery from La Fere." The French mobile army, in distinction from the German, had but very little heavy artillery. Early in the war it was frequently the case that the French 75-mm high explosive shells were reported as heavies. This was because its projectile had very thin steel walls and a very powerful loading of Molenit. The detonation was confusing.

During the battle the Guard Corps had sent for its heavy artillery which was temporarily with the X Corps. This now had to be returned to support the attack of the 19th Division and arrived on 31 August at 3:30 AM at Fay le Noyer, dug its emplacements, and reconnoitered. The Fort Mayot lay in front of the observers. The battalion sent an officer patrol toward it. It reached the fort without opposition, found it overgrown with weeds, abandoned, and empty. They took the key to the gates as a souvenir.

The Sphynx was finally exposed. There was nothing in the fortress.

Fortresses of the chain type are considered obsolete. Their place is taken by long lines of field fortifications like the French "Maginot" Line. But the old forts are still there, and can be of considerable effect. They can still resist modern weapons. The older forts can at least resist the light weapons. For example, the forts around Reims.

Early reconnaissance is therefore called for, both aerial and terrestrial, in order to evaluate the fortifications.

During the World War many mistakes were made in regard to fortifications, both in over-estimation as well as in under-estimation. Peace-time training along these lines was defective. Therefore it is necessary to develop training along these lines by means of maneuvers, staff trips, and war games.

(36) ALTE UND DOCH NEUE ZIELE INFANTERISTISCHER KAMPFAUSBILDUNG. [The modern objectives of infantry training.] Captain Püschel

The modern troop commander to a large extent is still an experienced World War fighter. In some cases he may have been a commander of special assault units (shock troops), and he may remember that when it came to actual fighting, man to man, the question of success or failure, life or death, was answered by the commander of the subordinate unit and not determined by higher leadership and command.

Whenever such a veteran describes his experiences he is given the closest attention and interest. Frequently the question is raised: "Why can't we learn these methods of fighting now?"

The argument is frequently raised that this type of fighting is obsolete. However, the experiences of the World War point otherwise. No matter how large the masses committed, there will always be objectives for the small group of individual fighters. The small detachment of determined men frequently achieved what masses and gunfire could never hope to reach.

The importance of training the infantryman in hand-to-hand combat is being realized more and more. The only man who can really become a first-class close-in fighter is a full grown man, who has completely mastered his weapons, and has a hardened physique.

The author recommends training in the following categories of close-in combat: (a) Raiding a trench system; (b) Capture of strong points; (c) Battle in villages and woods; (d) Fighting with and against tanks; (e) Night operations with limited objectives.

It will take a long time and much patience to get results but the efforts will be repaid by the interest shown by the trainees. From the morale point of view the results will be most important, for the infantry will be freed from the old conception of the scared rabbit type of operation, where all you do is to seek cover, and the infantry will be emboldened to conduct operations of an offensive and aggressive character.

(37) MANÖVERERFAHRUNGEN EINER PFERDEBESPANNTEN SCHWEREN ARTILLERIE-ABTEILUNG. [Maneuver experiences of a horse-drawn medium artillery battalion.] Colonel Böttcher

A detailed tabulation of the amount of marching, fighting, and camping done by a battalion of medium artillery during recent German maneuvers.

Some of the more interesting data are as follows:

Average day's march: 18 miles.

Horse casualties: Strength 277.

35 horses lost a day or more of duty

53 horses had minor injuries and continued on duty.

Bicycle inner tubes over the draw ropes reduced chafing.

The advance of the artillery at a trot to catch up with the advance guard should never be permitted. The staff, details, and communications, yes, but never the guns or the ammunition train.

The medium artillery was used on targets that the light artillery could have combatted. The medium artillery should have its own radio communications.

(38) WEST POINT. [West Point.] Dr. Wolff

A brief account of the curriculum and purposes of the United States Military Academy. Extract: "To me the consistent objective along technical and practical lines is the outstanding characteristic of this institution."

9 April 1937

(39) DIE TAKTIK DER FRANZÖSISCHEN ARMEE. [French tactical doctrine.]

The tactical doctrine of the French army has been adopted in whole or in part by a number of other nations as well. It represents a consistently logical picture. The following are the principal points worth noting.

The tactical doctrine of today is in France the result of their experiences during the World War. A great impression was made on the French by the tremendous defensive power of automatic weapons, which they first experienced during the Battle of the Frontiers in 1914. These early impressions are still governing the French attitude of today in spite of new developments, such as the modern tank, which is completely invulnerable to machine guns. This finds its marked expression in the fact that the French seek the decision in the attack, and depend upon the strength of their defense, primarily in matériel means: masses of artillery and tanks. Characteristic of French tactics is the fact that this is the tactics of a rich nation, which possessed during the World War every conceivable type of equipment and a superabundance of personnel. In view of its treaties of alliance, France will again be able to achieve this superiority.

They have also concluded from their war experiences that decisive results can only be secured by the offensive; but that these will only be

successful if certain precautions, which were neglected during the Battle of the Frontiers, will be applied. The first requirement is a determined and strict control from above. Corps are advanced from phase line to phase line, and the army, as well as the corps interfere to a degree unheard of in Germany, in the prerogatives of lower headquarters. For example, corps headquarters will determine the number of battalions to be in the front line in both attack and defense.

Great emphasis is placed in all situations upon security of the flanks, with both small and large units. At times disproportionately large forces will be used for this purpose. The threat of the tank has of course increased the worry about the flanks in addition.

This of course leads to a disapprobation of the advance of individual units ahead of the general line. According to French doctrine this usually leads to disaster.

"Tactical Prudence" is the distinguishing feature of the French. This is in contradistinction to the demand for "Strategic Audacity" in the large scale operations. Nothing is to be left to chance. This principle is followed in the development of all phases of the attack.

The division begins its approach march and development as it enters the range of the medium artillery, and at least 12,000 to 15,000 yards away from the enemy. First it is no more than an avoidance of danger spots. Then, as the advance continues it becomes more and more a branching out of march columns, so that by the time the column meets the enemy it is already completely deployed. Throughout this development phase there is constant protection against aviation and tank attack. As the detailed technique of the French development and approach is generally familiar, there is no need going into further details.

In accordance with the logical characteristics of the French, all phases of tactics have been developed and incorporated into a "system." Thus the attack is divided into a number of distinct phases. There is the "prise de contact," or the reconnaissance phase, the "engagement," or the holding attack, the "attaque," or the main attack, and finally the "achevement du combat," or the exploitation. This division into phases illustrates one of the peculiarities of French tactics.

If the advance guards meet the enemy, then the first phase, the "prise de contact" begins. The advance guard halts the hostile advance, maintains close contact with him, clarifies the situation, and gives the commander adequate data on which to base his decision, as far as this is possible, by terrestrial means of observation. Interesting is the frequent use of tanks, which are already employed in this phase to make thrusts against the enemy.

In recent maneuvers, the next phase, the "engagement" was frequently omitted. On the first day the advance guards, acting aggressively, were able to drive the enemy back to his main line of resistance, and this was attacked as early as dawn the next day. But the new edition of the French Field Service Regulations (Instruction sur l'emploi tactique des grandes unites, 12 August 1936) has retained the "engagement" phase. So this type of action will probably be included in their action against a hostile position. This "engagement" phase is executed in the form of a reconnaissance in force by one or two battalions with artillery support in each division zone of action. The purposes are: reconnaissance, locating hostile weaknesses, or gaining a more favorable line of departure. This phase also is to gain time during which the necessary supplies of ammunition are to be brought up. This delays the attack by at least one day. The modern tendency of using mechanized forces in order to hasten the entire attack procedure may of course assist in future actions in eliminating this phase of the attack.

The real attack is set for dawn as a matter of principle. According to French ideas an infantry attack can be executed only if supported by tanks. Those portions of the division which lack tank support will be carried on by the momentum of the main attack. Except in secondary theaters it is not believed that a French division will ever go into action in the future without the support of tanks.

Fundamentally the French desire the employment of masses of artillery. The artillery supporting the main attack of a division will practically always

be reinforced by at least one extra regiment, and correspondingly the principal efforts of the corps and army will be strongly reinforced with artillery.

Another characteristic of French tactics is that in the corps all (usually three) divisions are employed abreast, and in each division all three infantry regiments are in line. This results in neither the corps nor division possessing any sizable reserves. Larger reserves are available to the army commander. But the divisions are echelonned in depth, and thereby the mixing of units by the committing of reserves of another organization is completely obviated.

The attack itself is conducted from phase line to phase line. These are determined by the requirements of the artillery and the tanks. The infantry uses them to consolidate and reorganize. It is constantly on the alert for counterattacks.

So, protected against all possible accidents—supposedly—the attack advances with massive force; in reality an alternating play between the offense and the defense. As soon as the hostile main position has been overcome, an immediate exploitation is to be taken up. In view of the fact that automatic weapons alone were very easily stopped formerly, the French believe that tank masses, to be used like the cavalry masses in former days, are to be pursued with such aggressiveness that the enemy will never have the opportunity of reforming and offering a determined defense, unless he has already made provisions for such action in advance.

In connection with this apparently schematic type of attack it must be mentioned that for years the French have attempted to hasten the entire process. They believe that their new type "D" tank will enable them to gain such acceleration.

Let us now consider the French principles of the defense. This type of action is particularly well suited to the French character. The defensive system is organized in great depth so that the attacker will gradually find himself slowed up and ultimately exhausted. The defensive position is divided into the battle position and the outpost position. But if the situation permits it at all, units of the combined arms are to be sent out even beyond these towards the enemy. For this purpose the reconnaissance detachments, reinforced by motorized infantry, or, as was done in the maneuvers last year, even a cavalry brigade, can be well employed. This long range security is considered particularly important in this age of the tank.

The outpost line is organized into a line of observation and an outpost line of resistance. Their mission in all cases is clearly determined. There are cases when the outposts will have to be sacrificed.

The battle position is organized into a main line of resistance (ligne principale), the support line (ligne des soutiens), and the regimental reserve line (ligne d'arret) (last line). This last organized line is a peculiarity of the French tactics. Its purpose is to halt the further advance of an enemy who might have penetrated into the battle position. It is well supplied with machine guns. It may provide an unpleasant surprise to the invader, who has already considered the battle as won. Of course, these so-called lines are not really lines, but a series of mutually supporting strong points, adapted to the terrain.

The French defensive knows no such thing as a flexible form of defense for the corps and the divisions, and still less for the lower echelons of command. Every unit, and every man, must remain in the position to which ordered, to the bitter end, unless he receives orders to the contrary.

A peculiarity of French tactics is the groupment of their artillery, which is the same for the attack as for the defense. The various battle missions are assigned to the various types of artillery. Beginning with the division, the organization of the artillery is as follows: The division artillery furnishes each infantry regiment one artillery battalion for direct and close-in support. The medium artillery (155-mm) remains under the control of the division commander, which he uses as his means of controlling the battle. Counterbattery is the mission of the corps artillery (4 battalions of 105-mm and 155-mm guns). Interdiction is the task of the army artillery.

Occasionally one or the other may be used to support each other, but in principle this distinct and inflexible delineation governs.

Another distinctive feature of French tactics is their tank. At present new battle tactics are being developed in connection with the employment of the new "D" type tank. These are to remain, like the artillery, under the control of higher headquarters, and are to precede the infantry accompanying tanks (Renault).

The corps aviation is closely coordinated with the combattant ground forces. This is merely mentioned, not as some peculiarity, but as a matter of course, in order to complete the record.

To summarize: The French plan on executing their attack with great caution but with tremendous power behind them. The power of the defensive is no longer rated as great as it was formerly in view of recent developments in tanks, and in spite of the increasing effectiveness of antitank measures. One is of the opinion that in France the machine gun, so feared ever since the Battles of the Frontiers in 1914, has at last found its master.

(40) ERINNERUNGEN AN DAS "LOTHRINGER PROBLEM." [Memories of the "Lorraine Problem."] Lieut.General Marx

(41) DER BEWEGUNGSMECHANISMUS IM ZUKUNFTSKRIEG. [Mobility and the war of the future.] Major General Klingbeil

The modern tendency of all armies is to increase their mobility. Hence the motorized and mechanized units which every army is developing. All this presupposes maneuver warfare and the ability of units to cross all kinds of terrain.

For the same reason armies are also developing a technique which renders certain areas impassable to motor vehicles, or canalizes the enemy advance into terrain which is difficult.

This results in a slowing down of the anticipated operations, and the danger exists that our troops will fail us, because they will lack suitable roads for the bringing up of the required masses of ammunition, gasoline, and food.

The Italians have made outstanding advances in the development of a new technique for the rapid construction of military highways, based upon their experiences in Ethiopia. There are two principal methods which can be used. One is the cutting of new roads by means of steam shovels, pick and shovel, and the other method is to lay a new road bed over the terrain with steel supports. The cutting method requires little in the way of matériel and can be initiated along the entire line. The latter method is quicker and is particularly suitable for short distances over swamps or rocky areas.

The speed with which roads can be constructed depends usually upon the care and accuracy of the initial engineer reconnaissance. The Ethiopian Campaign proved to the Italians that in the first place motor trucks could operate in much more difficult terrain than was anticipated, and in the second place that the construction of roads gave the army a degree of strategic mobility which was undreamed of.

The total road construction in Ethiopia amounted to: 2,212 miles motor roads, of which 547 miles were surfaced two-way roads; 897 miles of railroads were equipped with sidings.

The engineers built 1,650 yards of iron and aluminum girder bridges; 450 bridges of wood, rock, and concrete were built.

At present the Italians have developed a bridge-laying tank to overcome ditches, arroyos and other gaps in the terrain.

The conclusion: Road building will be one of the most important operations of the entire war, both in construction as well as in the maintenance of roads in the theater of operations.

(42) FRIEDENSÜBUNGEN UND KRIEGSWIRKLICHKEIT. [Peace-time exercises versus reality in war.] Captain von Moltke

The World War was a constant process of elimination of the careless and thoughtless. At first it was believed that when new recruits came into the organization, they too, would be mowed down as the peace-time trained units were in 1914, or at least like the Americans in 1918. But nothing of the sort. The few veterans acted as instructors and by example and precept

showed the younger generation how to fight and remain alive. The important thing was: it was a matter of life and death.

In peace-time maneuvers it is not a matter of life and death, but usually of time. Units rush daringly forward. If they remain inactive, or advance carefully, they are criticized for lacking in dash. The author suggests that units should not be trained and judged by the amount of ground covered, but by the action taken. A unit is taken under fire. If it does nothing, then criticize it; if it rushes forward, penalize it; but when it carefully develops the combat, locates the hostile weakness, discovers where it can advance without casualties, it should be praised.

Such training is primarily the duty and responsibility of umpires.

(43) "HINHALTENDER WIDERSTAND" VOM GESICHTSPUNKT DES ARTILLERISTEN. [Delaying action from the artillery viewpoint.]*

The delaying action presupposes inferiority in numbers; therefore large sectors for the defending infantry and correspondingly thinly spread out artillery. The one thing the artillery always wants to know is the location of their own front-line infantry. This is necessary so as not to endanger their own infantry and also in order to be able to give better support. But the greater the extension of the defensive sectors, the more difficult is observation and also the poorer will be the communications. Even though the artillery is supposed to open fire at maximum ranges, it must also be able to furnish a good defensive fire when the actual attack of the enemy approaches our front lines.

For that reason the suggestion that the delay in successive positions be termed "delay for a limited period" is a welcome one. Then the artilleryman will know where their own front lines are located at the beginning of the predetermined time for withdrawal, and also can plan his own rearward displacement well in advance so as to offer the infantry continuous artillery protection.

(44) ZUR FRAGE DER VERTEIDIGUNG FÜR BEGRENZTE ZEIT. [The delay for a limited period.]

Situation: A reinforced regiment acting as rear guard of a division. At the same time that the rear party is being attacked, the rear guard commander is informed that the main body is having trouble crossing a river. How long it will be delayed he does not know, but certainly for at least several hours. High ground about 7,000 yards from the river crossing offers a good position. Time: 10:00 AM.

Requirement: The decision of Colonel A.

Discussion: Delay in successive positions is not applicable. There is only one. Defense is also not the answer because there is neither time nor space for the creation of a defensive position in depth. Therefore, a "delay for limited time" is the answer. But this type of operation is not in the German Field Service Regulations and is not being taught in their schools. Hence the argument in favor of the new term.

(45) AUSBAU DES OFFIZIERKORPS DES BEURLAUBTENSTANDES. [Training of reserve officers.] Dr. Voltz

An argument for a wider scope to Reserve Officers. Quoting the practice in France, Italy (4/5 of the officers in the Ethiopian Campaign were Reserve Officers), and Switzerland, the author suggests that battalion commanders and assistant general staff officers be drawn from the reserve. He does not believe that reserve officers will ever make general staff officers.

The editor adds a note to the effect that this is now being done in Germany inasmuch as it applies to World War veterans.

(46) DIE NACHSCHUBFRAGE IM ABESSINISCHEN FELDZUG. [The problem of supply in the Abyssinian Campaign.]

Recommending a new Italian book by General Fidenzio Dall'Ora, entitled: "Intendanza in A.O." Not as dry as the title sounds.

[*NOTE: The German military press has recently argued pro and con as to the technique of the delay in successive positions. One school of thought has proposed that delaying action be termed "delay for a limited period." This article adds an artilleryman's viewpoint to this controversy.—TRANSLATOR.]

The Italians had to figure on the possibility of the Suez Canal being closed to them, and for that reason had to figure on their army in Ethiopia being equipped with a six months store of supplies. They bought wheat flour in Australia and India so that there would be no shortage in Italy in case of a World War. Throughout they had to be careful not to denude Italy of essential raw materials.

Criticisms: Unsuitable trucks; lack of aircraft suitable for matériel transport; shoes and helmets proved unsatisfactory in quality.

Conclusions: Rapid industrial mobilization. There is no such thing any more as a purely peace-time industry; no nation can afford to maintain an industry that is not convertible or makes items usable in war; types of production must be influenced to develop items usable in combat.

(47) ZIVILISATION UND KRIEGSROHSTOFFVERSORGUNG. [Civilization and raw materials.] Dr. Ruprecht

The higher the civilization, the more complicated the raw material requirements. The World War indicated how interrelated all nations were. What damaged one country hurt all of them.

The development of modern armament has increased raw material requirements but has not shortened the duration of war (Spain). The answer may be found in small, highly armed and armored armies, very mobile, mechanized, and heavily supported by aviation.

Sweden is considering a plan whereby copper and nickel will be obtained in exchange for gold and used as a basis for her currency.

The conduct of war requires not only gold and organization, but also political foresight and planning ahead.

16 April 1937

(48) AUS GROSZER ZEIT VOR ZWANZIG JAHREN. DER EINTRITT DER VEREINIGTEN STAATEN IN DEN WELTKRIEG. [Twenty years ago: The entry of the United States into the World War.] Admiral Spindler

This very able naval writer discusses the causes of America's entry from a modern viewpoint. The report of the Nye Committee (1936) is given due weight. The author comes to the conclusion that the German diplomatic service (Foreign Office) handled the situation very badly and used poor psychology. He states that the announcement of unrestricted submarine warfare of 31 January 1917 left America no choice but to enter the war on the side of the Allies.

The entire article is a credit to the author and the objective viewpoint adopted.

(49) DAS PROBLEM DES OPERATIVEN UND TAKTISCHEN ZUSAMMENWIRKENS BERITTENER UND MOTORISIERTER HEERESKÖRPER. [Coordination of horse and mechanized cavalry.] Captain Mürau

A study of current military literature indicates clearly that in all countries the desire for a war of maneuver exists. Position warfare will reappear of course on secondary fronts, as soon as armies assume the defensive. No army will be strong enough to continue offensive operations all along the line. But under all circumstances every effort will be made to prevent the stabilization of the principal battle front. The World War proved that artillery and the mounted forces were unable to prevent this occurrence.

The idea of using highly mobile units for a strategic move against the hostile flank and rear is no new one. In spite of this we find, in studying military history, that cavalry masses have been rarely so used. As a rule they were kept with the main body of troops, and their mobility was used tactically rather than strategically. Schlieffen, the great apostle of the wide envelopment, called for the strategic employment of the cavalry. But his ideas were rejected in 1914 both in leadership and training. This was due to the lack of experience in the handling of large masses of cavalry and also due to inadequate armament of this arm.

Highly mobile forces promise on the other hand to become extraordinarily valuable means in the hands of the commander-in-chief. In addition to the infantry with its constant speed of two and one-half miles per hour, there is demand for powerful and highly mobile forces in these days of

aerial warfare. If they can prevent the immobilization of the fighting main armies they will have fulfilled their principal mission.

The question now is: What characteristics should such a unit possess in order that it can carry out its mission in this day of firepower?

The first requirement obviously is "mobility." By this we mean the ability to move with all its combat means in all kinds of terrain, in any sort of weather, by day and by night. This unit must therefore possess mobility beyond that of the bulk of the army. These qualifications are all possessed by mounted units.

The second requirement, which is just as indispensable as the first is "speed." By this we mean the ability to be able to intervene quickly and at great distances at dangerous points in the battlefield. The unit must have a long radius of action and be able to move at great speed. This qualification is possessed primarily by the mechanized units.

The third requirement is fire-power, which permits a moving unit to continue in motion in spite of hostile countermeasures.

The problem of a mobile unit therefore consists of giving the organization the tactical cross-country mobility, together with speed and a long-reaching radius of action. At the same time the unit should be endowed with the maximum amount of fire-power which can be achieved without sacrificing mobility and speed. The heavier a unit is armed the more it again is slowed down. The problem could be solved if horse and mechanized units could be used for strategic purposes in coordination. For, next to the infantryman, the horse has the greatest cross-country ability. The motor, on the other hand, would give the unit the two other qualifications: speed and fire-power.

Therefore it might be well to ask the question: Is a cooperation and coordination between horse and motor possible for strategic purposes?

The maneuvers of all the larger countries have in recent years attempted to bring the problem of the cooperation between horse and motor to a reasonable solution. In the fall maneuvers of 1932 the French organized a cavalry division consisting of the mechanized brigade and two horse brigades. It is worth while to briefly consider the advantages and disadvantages of the "Cavalry Division, Type 1932," of which the French still have some, in order to consider any lessons we may be able to draw therefrom.

The first, but also the only advantage is that the division possesses good tactical mobility, which permits it to execute its mission in any kind of weather and in all sorts of terrain. They have two parts: the motorized units for open country and with good roads, and the horse units for wooded and broken terrain.

Opposed to this advantage there are, however, also a number of disadvantages. The command and troop leading of such a unit offers certain difficulties. The movements of both types of units must, on account of their varying rates of march, be very carefully coordinated. "Tactical Groups" under subordinate commanders must be created, due to the very varied missions applicable. This results in a splitting up of the unit, and may cause its defeat in detail. The length of the column of this division amounts to 45 miles, marching on roads. This makes it very vulnerable to air attacks.

Another disadvantage is the length of time it takes to commit such a division. It takes three or four hours before the horse cavalry can be coordinated for the attack after contact. Surprise is therefore out of the question.

The principal disadvantage of course is that the march rate of the horse cavalry is so slow in comparison to the mechanized parts, that the initial success of the mechanized brigade can not be exploited by the cavalry. Consider the matter of speed alone. The rate of march of the tank units is three times as great, and that of the motors five times as great as that of the horse cavalry. Inasmuch as the rate of march of this type of cavalry division depends upon the horse elements, its strategic mobility may be said to be practically zero. We can see, therefore, that the intermingling of rapid and slowly moving elements slows down the rapidly moving ones, makes surprise difficult, and thereby deprives them of their most effective weapon.

Considering these serious disadvantages one is forced to the conclusion that the French cavalry division, type 1932, is an unsatisfactory solution to the problem. Although this type of division has adequate tactical mobility for local offensive operations and for the defensive, it fails to take advantage of the strategic mobility and speed of the motorized elements. Problems which involve long range operations and a certain degree of fire-power can not be solved by this type of unit.

The French apparently came to similar conclusions, for in 1934 they created the light mechanized division which consists of motorized and mechanized units. This light mechanized division (evolved from a type 1932 cavalry division) is much easier to command, because it consists only of motors and has an adequate radius of action. Its cross-country mobility on the other hand is not very great because a large proportion of its motors are still limited to roads. It possesses high degree of fire-power as a result of its tank brigade. It therefore has all of the required qualifications: mobility (still somewhat limited), speed, and fire-power.

The terrain of course sets certain limits to the employment of mobile units. In Western Europe of course there will be no difficulty, with its system of roads. But how about the Eastern theater of operations? Surely motorized units will run across many terrain difficulties there as soon as they leave the roads. Meandering rivers with swampy banks, bottomless roads in the spring, fall, and winter, and enormous areas of forest, will be met. Therefore the abandonment of the horse cavalry in favor of the motor has not been the vogue here. Poland, and especially Russia, still have large masses of horse cavalry, and these countries believe that these units will bring the decision.

In the field of strategic reconnaissance there also is no mixture of horse and motor. During the World War distant reconnaissance was carried on by the cavalry patrols. But in these days of motorized units the speed of the horse is no longer adequate for a timely report of what he has seen. All countries have abandoned horse patrols for motorized units for distant reconnaissance missions. The creation of the motorized reconnaissance detachment may be said to be the one original organizational creation resulting from motorization.

Let us now consider the question of whether a tactical cooperation between horsed and motorized units is possible.

At a certain distance from the enemy, strategic reconnaissance becomes tactical. The purpose of tactical reconnaissance is to see and to report, but above all to see more than the enemy, and also to prevent him from seeing. This calls for superiority in the reconnaissance zone. Reconnaissance agencies must therefore also possess speed and fire-power. It is true that the horse so far has not been exceeded by the motor in cross-country mobility; but its subject to fatigue and vulnerability to automatic weapons remains. Therefore it is obvious that by motorizing the scout we can send him farther, and the next step is to protect the patrol by armor. The tendency today is to attach armored scout cars to all mounted patrols. Practically all countries have done so, and equipped the scout car with automatic weapons, even antitank weapons, and by means of six wheels suspension or caterpillar treads, to enable this vehicle to continue off the roads. An evaluation of the recent fall maneuvers indicates, however, that the cross-country mobility of the scout cars is at present still inadequate, and it is hoped to replace them with light tanks or semi-tanks. Such vehicles are particularly suited for an advance into hostile territory and to disturb the enemy's advance. No strategic employment of these motors is contemplated. The organic assignment of motorized forces to mounted reconnaissance agencies is therefore of great advantage. The horse and the motor supplement each other. They see and they fight shoulder to shoulder.

For the same reasons that it has been found desirable to assign horsemen to the infantry division, it is desirable to attach motors to cavalry units—that is, for their own tactical reconnoitering. It is a principle that units can only take advantage of their full mobility if they have attached to them reconnaissance agencies of greater mobility. By attaching motors to cavalry units these will be able to maintain their maximum marching rate for a

much longer time. As contact with the enemy becomes closer, cavalry reconnaissance will gradually supplement, and ultimately replace the motorized reconnaissance. Even today motorized reconnaissance has two distinct disadvantages as opposed to mounted reconnaissance.

The first contact, of course, is established much sooner than it is with the horse cavalry. But from that moment reconnaissance proceeds slower and slower. This is the result of the limited cross-country mobility of the present scout car. But effect upon the enemy and mobility are intimately interlinked. The greater the cross-country mobility of a unit, the better it will be able to take advantage of the terrain and to avoid any undesirable contact with the enemy. However, as the cross-country mobility of motors is being constantly improved it is hoped that this disadvantage will gradually disappear.

The second disadvantage is that motorized reconnaissance can never search terrain as thoroughly, nor comb the country as well for enemy as a horsed unit can. The reconnaissance vehicles can not go quickly and soundlessly into thick terrain. In addition the limited visibility out of the vehicle, and the noise of its own motors, renders observation more difficult. The motorized reconnaissance must therefore be supplemented by the horse. Success lies in the cooperation between both types in the realm of tactics.

In conclusion we may say that the status of cooperation between horsed and mechanized cavalry as a result of modern experiences is as follows: Strategically only purely motorized units are satisfactory, because they are the only ones possessing adequate mobility, speed and fire-power. The outstanding advantage is their speed which permits them to develop their fire-power at distant objectives against the enemy at decisive points. Horse units organized with these act only as a brake and for that reason are not recommended. The various speeds call for unified organization and not mixtures. The cavalry divisions should therefore be either horse or mechanized, and commanded by specially trained personnel.

Horse units can be assisted in the execution of their missions of reconnaissance, counterreconnaissance and security, by means of assigned motor vehicles. The tactical cooperation between horse and motor is possible and promising of much success in this type of unit.

(50) MODERNE INFANTERIE. [Modern infantry.]

"Whoever says 'Infantry,' says 'The People' in the full meaning of that word, and at the same time he means the greatest courage of the people, from the beginning of history to today. Whoever says 'Infantry' means the decisive element of battle and of the war as a whole, today as yesterday, tomorrow as today, and forevermore."

These words of Mussolini's are worthy of attention, not only because they come from a statesman whose courage and energy every soldier admires, but also because they come from a country which knows how to use every aid of science to the fullest degree. In spite of this—or on account of it—we find this evaluation of the infantry.

The development of new weapons—the tank, aviation, antitank units, etc.—have recently led to a lack of appreciation of the infantry. Even in German regulations we find the statement: In the attack the purpose of all arms is to "enable the infantry to reach the enemy, by means of fire-support, so that they may break through him and to finally break down his resistance."

What must the infantry do in order to solve the missions with which it will be confronted in war? Tactics are always changing, and the development of the new technique of weapons always forces new changes. The effect of the breach loader and the magazine loader led to the abandonment of the close order formations; it forced the firing from the prone position—up to the beginning of the Franco-Prussian War of 1870 they were still shooting from the standing position. During the World War the unexpectedly powerful effect of machine guns and artillery opened up the formations still more, and led to entirely new attack formations.

The problem of the infantry lies in other fields. The approach to the enemy through distant and medium ranges is facilitated by aviation bombs and the artillery. Defensive weapons are to protect the infantry against

aviation and tanks. To do this with maximum effectiveness are problems of those specialist arms. But the problem of overcoming the last 300 or 400 yards is still that of the infantry. All efforts to help the infantry in this last mission have so far been of little avail. The biggest help so far is still the tank. But the difficulties of the cooperation between tanks and infantry has been very ably discussed by General Eimannsberger in previous issues of this magazine. This cooperation will probably fail to click in many cases; but more frequently still, there will be no tanks available at all.

A consideration of how to increase the battle efficiency of the infantry, left probably to its own devices in the final analysis, leads to a number of possibilities. Without doubt, modern infantry must be filled with an aggressive spirit, and must be at the highest stage of physical development and of high agility.

Let us consider training in marksmanship. Nowhere in the German army has the pre-war standard been achieved. This is particularly true of the principal weapon of the infantry: the light machine gun. Such experts with this weapon as the end of the World War produced and as were found in the professional Reichswehr, one does not find any more. Rifle and pistol marksmanship must be improved too.

Another weapon with which the infantryman should be thoroughly familiar is the hand grenade. He should become a regular virtuoso with this weapon. Such familiarity as we had during the war with explosives of all kinds, of course can not be readily achieved in times of peace. The use of mines and other explosives also call for peace-time training with real grenades. A minimum of five or six grenades per man should be available to the army each year.

Now we come to the real battle training. The time available is only too short. The infantryman must be drilled in certain functions so that he can execute them automatically in battle without thinking, such as loading rifle and machine gun; changing bolts and barrels; wearing the gask mask; jumping off, etc. Then also comes training in the utilization of the terrain, camouflage, scouting and patrolling; messages and all sorts of other things. If four days a week are devoted to this combat training, two days for marksmanship, it leaves the afternoons for drill, care of weapons, indoor instruction, and athletics. It is physically impossible to cover all the requirements of close order drill demanded by training regulations, in the afternoons alone. This is particularly true of the machine gun, cannon, and antitank companies. Recently suggestions have been made for the simplification of close order drill. The logical conclusion is: abandonment of close order drill. All the arguments used in favor of close order drill are unsound. It does not aid the marching ability of the soldier. That is done by means of practice marches and lessons in care of the feet. Another argument is "discipline." It is a pretty sorry state when we must use obsolete battle formations of a bygone era as an excuse for the creation of discipline. The modern soldier has to be drilled in so many functions which he is expected to execute in battle automatically, that he gets all the disciplinary accurate instruction that he needs. The final argument: Public appearances at parades, etc. Anyone who has seen a large unit in mass formation, keeping step, must admit that it presents a very fine military picture. The infantryman just does not have time for close order drill. He has too many other things to learn. It is not needed in war. This wasted time is required in combat training.

Only that infantryman who has developed himself to the maximum efficiency in all phases of his profession, one who knows how to use machine gun, rifle, pistol, cannon, mortar and antitank gun, who knows how to utilize the terrain, will be able to measure up to the standards which will be demanded of him in war. The prerequisite to all this is of course that he is morally fortified and convinced that he must sacrifice everything for his country, even his life.

(51) KOLONIALOFFIZIER UND AUSLANDSKOMMANDO. [Service in colonies and foreign armies.] Captain Drück

A very interesting article in which the author indicates that many of the great soldiers of all armies received their training in colonial wars and as

soldiers of fortune with foreign armies. The author quotes an American officer stationed in Panama, saying that he did not mind the climate nor the monotony "because he would be a more efficient officer when he returned home." He also mentions the services of Count Zeppelin in the Civil War. Of 223 regimental officers who received the order "Pour le mérite" (the highest German award), 48 had served in the former German colonies.

(52) DIE NEUE SCHWEIZER TRUPPENORDNUNG. [The reorganization of the Swiss Army.]

Switzerland is now organized territorially into 9 division areas and 3 mountain brigade areas. In addition to the 3 mountain brigades, the 7th, 8th and 9th Divisions will be equipped for mountain warfare. All these units are organized into 3 corps of 3 divisions and mountain brigade each.

The entire Swiss army is organized, trained and equipped for the defense of that mountainous country against any and all who might try to violate her territory.

(53) DIE ORGANISATION DES FRONZÖSISCHEN INFANTERIEZUGES. [The organization of the French infantry platoon.]

A review of two recent articles appearing in "La France Militaire" by Lieutenant Colonel Kuntz. The problem confronting the French was whether to organize the platoon out of three identical squads, or to have three differently organized squads. Due to difficulties in furnishing trained platoon leaders in war, they have decided to adopt the simpler system of having three identical squads.

The platoon commander is an officer or warrant officer. The assistant platoon commander, a noncommissioned officer, organizes the riflemen, in case so desired, as a separate unit, while the platoon commander leads the machine guns. There are also some grenadiers in the platoon. Strength: 4 sergeants, 7 corporals, 34 privates. Every sergeant must know how to operate a machine gun. Before a reservist is excused from duty he must know how to handle the automatic rifle.

23 April 1937

(54) GENERAL DER ARTILLERIE V.GALLWITZ. [General v.Gallwitz.]

An obituary, by the editor of "Militär-Wochenblatt," of the army group commander who was opposing the American Army at the time of the armistice.

(55) SOLDAT UND STAATSMANN IN KRIEGSZEITEN. [Soldier and statesman in war.]

A discussion of the lessons to be drawn from Lloyd George's memoirs. In general the reviewer favors the ideas of Lloyd George. He clearly delineates the sphere of soldier and statesman, and announces that as a matter of principle the politician should never interfere with strategic decisions. He admits that a real military leader is the result of much painful training, but that he must be gifted as well.

(56) DIE TRAGISCHE STUNDE. [The tragic hour.] Major Braun

"The Tragic Hour" is that moment when the hitherto silent weapons of the defense open up on the attacking infantry. Also called the "Blue Zone," the last three or four hundred yards of the attack are the greatest problem of modern battle.

Italy has been particularly lavish with modern weapons to its infantry. Two kinds of trench mortars, 47-mm guns (or two sorts—curved and flat trajectory), submachine guns, light, heavy, and armor-piercing machine guns, small and large antitank guns, and finally antiaircraft weapons, are all assigned to the infantry. Now they are talking about adding semi-automatic rifles and self-propelled heavy machine guns. But all this is inadequate to assure the steady advance of the infantry past those final three or four hundred yards. An Italian author (Lieut.Colonel Verna) suggests that this can only be solved by the tank. These tanks are to advance so that they will leapfrog the infantry at the very time and place when it is halted at the outer edge of the "Blue Zone." The trouble with this suggestion is that the timing of such an assault by tanks is practically impossible in time of actual battle. It has been tried in Spain, sometimes with success, at other times with failure.

Other Italian authors use a series of tank attacks consisting of accompanying tanks, penetrating tanks, and exploiting tanks. All this is fairly complicated and does not always work, because the leapfrogging of tank units is not always a simple matter.

The author concludes by stating that "everything depends upon the situation," and above all there must be no fixed scheme.

One school of thought feels that tanks have nothing but a strategic mission; others say that "tank soldiers are nothing but infantrymen." The answer, of course, lies in the middle path, between these two extremist views.

(57) FEUERFORMEN UND FEUERSCHUTZ. [Artillery fire nomenclature.] Lieut.General Boltze

A discussion of the use of certain German technical terms applying to classes and types of artillery fire.

(58) MILITÄRISCHE AUSBILDUNG VON RESERVE-OFFIZIER-ANWÄRTERN AN DEN HOCHSCHULEN. [Military training of reserve officer candidates in colleges.] Lieutenant Crone

A study as to the desirability and methods to be used in fitting college students for reserve commissions in Germany. The author proposes to set aside one day of the week for this purpose, and make it up by reducing the annual summer vacation by the number of days thus lost to studies.

(59) DAS PFERD IN HEER UND WIRTSCHAFT VON HEUTE. [The horse in war and industry today.]

Frankly stating that in modern war in a densely populated district the horse will have little military use, the author believes that it will replace many motors and tractors on farms, thus avoiding a shortage of gasoline, and releasing the motors for army use. He also states that the horse cavalry of Russia is primarily for political purposes rather than for purely strategic employment.

(60) TRUPPENTRANSPORT IN FLUGZEUGEN IM ENGLISCHEN HEERE. [Aerial transport of troops in the British Army.]

The author enumerates instances where the British have recently used air transport in order to shift troops in emergencies. He quotes a threatened revolt in Cyprus, their use in Palestine, in Irak, etc. He then quotes the British Field Service Regulations in the matter. The difficulties are much greater in that army due to the fact that the air force and army are entirely separate.

(61) TSCHECHISCHE ANSICHTEN ÜBER GLIEDERUNG UND EINSATZ DER ARMEE-, KORPS- UND DIVISIONSARTILLERIE, WIE SIE SICH AUS DER TSCHECHISCHEN MILITÄRLITERATUR ERGEBEN. [Czechoslovakian ideas as to the employment of artillery.]

A brief resumé of the present tactical doctrine in the Czechoslovakian Army as to the employment of field artillery. The doctrine is very similar to the French and to the American, providing for groupments in direct support, general support, counterbattery and long-range interdiction.

(62) SCHIESZEN UND SCHIESZAUSBILDUNG. [Marksmanship training.]

The author believes that training with the light machine gun (automatic rifle) is much more important than training with the rifle, and though initially easier, in reality is much more difficult. The article goes into great detail as to the methods to be used in rifle marksmanship training. Many of his ideas are entirely foreign and opposite to the American conception of training in this subject. Among other things he states that small caliber work is a detriment rather than a help, and also that pre-military marksmanship is not advantageous. The recruit who has never held a rifle in his hand usually makes the best shot, says the author. Primarily interesting to us is the statement that the light machine gun is the principal arm of the infantry.

30 April 1937

(63) EINSATZ UND ABWEHR VON FALLSCHIRMTRUPPEN. [The employment of and defense against parachute troops.] Lieut.Colonel Leon

During the World War spies were dropped behind the German lines, and in Palestine the Germans occasionally dropped adventurous individuals who would disturb the British communications and water supply systems.

However, there was no record of the employment of parachute troops in quantity or with a combat mission.

The Russians have been experimenting with the "vertical envelopment" for some time. Recently they dropped 1,200 men with 150 machine guns and 18 cannon from airplanes in flight, 100 miles behind the maneuver front. During 1937 it is anticipated that Russia will have 100,000 trained parachutists.

The Russians teach two types of "vertical envelopment": (a) The close-in, which merely facilitates the ground maneuver by threatening the hostile flank from an unexpected direction, and (b) the wide, where troops are carried far back of the front line for the purpose of destroying communications, and for political reasons. (Vital strategic points.)

A vertical envelopment is favored when: (a) The enemy has no, or inadequate, antiaircraft defenses; (b) Landing can be made in friendly territory, where the inhabitants will render assistance and furnish supplies; (c) Landing in the rear of a defeated and demoralized enemy; (d) Favorable factors of terrain, enemy situations, and weather.

It would be interesting to find occasions when such favorable opportunities existed during the World War.

The weakness of the vertical envelopment lies in the following: (a) During the actual descent, the personnel is absolutely helpless—this is estimated as a period of four minutes; (b) The confusion resulting upon landing; (c) Lack of support by other weapons or arms; (d) Immobility; (e) Difficulties of supply, except by air.

The advantages of the vertical envelopment may be said to be: (a) The surprise achieved; (b) The high combat efficiency of the unit, which will always consist of specially selected and highly trained personnel.

The defense against the vertical envelopment: (a) Enrolling all inhabitants in the armed forces, giving them the distinctive insignia of combatants, and placing them under the command of former army officers. Their mission is to attack the parachute unit while it is still in the air. (b) The creation of specially designated, highly mobile units for the prompt attack of parachuted troops as soon as they have landed.

There are other possible uses of parachute troops. For example, roads may be impassable or blocked, and infantry can not advance fast enough to seize terrain features or to hold those already in the hands of the mechanized or horse cavalry. In that case reinforcements might be dropped from the air.

A landing behind the hostile front is not the only possible use of air transport. It is to be considered as an additional means of transportation of great speed and large range.

(64) GEDANKEN ZUM THEMA "MOTORISIERTE DIVISION." [The motorized division.]

The Italian General Targa has recently published a very interesting article on the motorized division. In brief, his ideas are as follows:

The motorized division is nothing but an ordinary infantry division with greatly increased radius of action. On the other hand, it is more sensitive to disturbed road conditions than an ordinary division. The very organization of a motorized division indicates that it is designed for special missions by the army. A rapid advance, a sudden, surprising and determined attack, characterize this type of unit. For that reason its personnel should be particularly chosen for their quick thinking and ability to make rapid decisions.

In numbers of personnel the motorized division is smaller than the infantry division, but in striking power it is about the same, due to its increase in weapons. The quality of the individuals assigned to such a unit also contributes to the equalization of combat strength with the numerically superior infantry division.

The problem of tread for the vehicles is of importance, but there is no use selecting vehicles of a non-standard narrow tread, when there will be other, and essential vehicles which must follow these of standard tread. Another problem is whether to design and maintain a special personnel carrier. These look fine on parades, with their built-in benches, compart-

ments for equipment and weapons, but unfortunately are useless for any other kind of load. Would it not be better to return to the old type all-purpose box truck, with removable benches, and available for the hauling of ammunition and Class I supplies as well.

Another problem is the subordination of the transportation. Up to now it has been the custom to place the motor vehicles under a motor transport officer. On the other hand, the possibility of attack while in column, or while approaching the battlefield, as well as the protection of the parked vehicles all demand a form of combat leadership. Therefore, it is believed that the drivers should be trained as infantrymen, so that they can defend their parked vehicles without demanding a special detail for this purpose, and that the vehicles also should become an integral part of the infantry regiments. The trucks are not only a means of transportation, but in a sense, combat means as well.

The tremendous number of vehicles composing such a division, and the enormous length of the march column (about 45 miles), makes it appear to some that these units are entirely too clumsy to handle practically. The answer is that the motorized unit can be readily broken up into echelons. Due to the speed with which they operate, it is not necessary that the supply echelons, for example, follow the combat echelons closely. They can be held back and come up later. Also the conception of a motorized column marching with radiator pressed against the preceding tailboard is all wrong. The distances between vehicles are considerable. March discipline, however, is very important with a motorized division. It can make or break it, and the least slip will affect not only it, but all the other units which are about to use the road. In recent maneuvers an Italian motorized division covered over 600 miles in day and night, with and without lights, without interfering with the civilian traffic, and without a single accident.

General Targa recommends that as a minimum a motorized division should have as much artillery organically as an infantry division. Uusually a motorized division will not be in a position to receive support from the corps or the army.

Another problem is that of gasoline and oil. There are three methods possible: Spare containers on the vehicles themselves, tank trucks, and depots. The latter is impracticable in operations. The Italians used a combination of the container and the tank truck systems in Ethiopia. Improvements in the technical design of additional gasoline tanks are still to come.

A motorized division is primarily intended for terrain with good roads. It is not designed for sustained action, but for rapid, unexpected, short, employment.

(65) Die Radfahr-Kompanie beim Infanterie-Regiment. [The bicycle company.]

An argument in favor of this European type unit. Very mobile—even over terrain impossible for motor transport. Considerably greater speed than a rifle company, and as much fire-power as a rifle company. It is inexpensive, readily obtainable in mobilization, and even if not used, leaves the fire-power of a rifle company available for action.

(66) Infanteriegeschütze—eine Erwiderung. [Infantry cannon.] Major Blecher

A discussion of the effect of conscription on the German Army as against the days of the Reichswehr. Due to lack of highly trained leaders the tendency becomes more and more to keep subordinate units (platoons) under the close supervision of the company commander, especially when echelonning forward.

Infantry cannon are accompanying guns. As a rule they are employed by platoons. Their targets are point targets, which they combat with a few aimed shots from covered positions. In the attack, infantry cannon are always attached to battalions, initially. In the defense they may be later during the action, or if there is ample time available. The cannon company commander does not belong at the regimental command post but belongs at the battery position or with one of his platoons.

(67) UNKLARE BEFEHLE. [Unclear orders.] Lieut.General Marx

Modern military history presents a remarkably large number of instances when indefinite orders, issued in haste, have resulted disadvantageously. In the battle of Kolin, the attack of Manstein was the result of such a misunderstanding; in the battle of Kulm-Nollendorf a critical situation arose because Napoleon hastily issuing orders from his carriage caused the road to Altenberg to be confused with that to Annaberg. At the battle of Spichern, Goeben, who had ridden ahead with part of his staff, said to an officer: "Ride back; the chief of staff is to bring up everything that is still in rear." He meant thereby a division in reserve and the corps artillery. The officer rode back and informed the chief of staff that what was still left in rear of corps headquarters was to move up front. This was done, but the division still remained in reserve way back. In the battle of Vionville, the confidential advice that the withdrawal might possibly go as far as Thiaucourt, resulted in the shouted order: "Withdraw to Thiaucourt," and almost caused a complete collapse of the left flank. The defeat of Adua in Ethiopia in 1896 was in part caused by the fact that there were two mountains which had the same name on the map, were confused with each other, and separated the Italian Army. At the battle of Longwy an officer of the German Fifth Army received the order to: "Take the fastest car and drive to General von Mudra. The XVI Corps must hold at all costs. The hostile attack will then collapse." The officer understood and delivered the message: "The XVI Corps must hold at all costs, our attack is collapsing." In the same battle, portions of the French 40th Division (flank division), withdrew in a totally wrong direction as a result of a faulty order.

In all these cases the orders were misunderstood by officers because they were given in haste and were not clear. The fault in each case was not that of the officer who misunderstood, but the fault of the officer who gave the order. On the other hand there are innumerable examples where messages were delivered wrong by runners, and messengers because they did not understand the meaning. We all can remember such instances from maneuvers. As a result we have always distinguished between orders to officers and those to others, and have for that reason been almost extravagant in using officers as messengers. Since the development of the telephone the same distinction continues. Who of us does not remember having yelled into the transmitter: "Please get an officer to the telephone!" Now why is it that certain orders can only be understood and received by officers? Was it because the officer had a higher education and studied more Latin and mathematics? Surely not, for during the war we found out that college graduates among the enlisted personnel made just as many mistakes as the rest. Nor can it be merely a matter of memory. The reason is this: Long orders can only be relayed by people who understand what is meant by them. The officer, as a result of his long training, working map problems, map maneuvers, etc., has learned to understand the meaning behind the technical terminology. We want to emphasize this point because it has been frequently stated that lieutenants go to the staff school to learn how to command divisions instead of platoons. It is true, very few of these lieutenants will ever be division commanders, and by that time everything will be different anyhow. But on the other hand, he will have become familiar with the technique of division orders and he will be in a position to understand the purpose and meaning of all orders issued in connection therewith. I remember a case where I was at a station hospital where the surgeon gave a long series of instructions to an interne. The interne did not even repeat the orders, but merely said "Yes, Sir," and disappeared. At the time I asked myself if I could repeat that order, and I had to admit that I would be unable to do so. The same experience has been had by many an artillery officer, who heard a signal officer tell another something about radio communications, which was to be repeated later. The argument is this: The only orders we can repeat are those which we understand. For that reason it is important to develop the understanding for such orders with the enlisted personnel. General Haeseler used to warn against the parrotlike repetitions of orderlies and the memorizing of orders. In his corps, the XVI, such improvement was shown that Pertev Bey, who also

was familiar with other German troop units, said it was always a pleasure to hear the mounted orderlies in that corps receive and deliver messages, frequently to the surprise of battery commanders. We soon found out that it paid to train the buglers as artillerymen with the aiming circle and at noncommissioned officers schools. The purpose was the same: Whoever has to deliver a message must be able to understand it.

A World War illustration: On 8 September 1914 a brigade messenger was sent to a battery with the message: "The battery to move forward and go into position there; general direction: Those high poplars." The expression "general direction," was a technical expression in use since the publication of the artillery drill regulation of 1907, and familiar to every cannonier. The messenger, however, was a motorcycle driver and he reported: "The battery will advance in the general direction of those high poplars." As a result the battery advanced in front of its own infantry. Had the messenger been a former cannonier he probably would have understood and delivered the message accurately.

There is a great deal that must be taught soldiers, but a great deal is non-essential, such as the orders for stable and barrack maintenance, the pay table, etc., and it would be far better not to force such items on the men's memories, which they can look up any time in the regulations, when there is so much important matter to be mastered.

(68) VOM SPANISCHEN KRIEG. [The Spanish War.] Colonel v. Xylander

(69) MILITÄRPOLITISCHE BALKANPROBLEME. [Military problems in the Balkans.]

A discussion of the military geography of the Balkan Peninsula. The Balkan armies are primarily organized and equipped for mountain warfare. In view of the fact that there are no real strategic objectives in the Balkans, the plan of the countries there is to fight and contest every foot of ground, and to hold what they have tenaciously. The author believes that the Balkan countries would give any invading force nowadays a tough nut to crack.

(70) DIE VERSUCHSDIVISION DES HEERES DER VEREINIGTEN STAATEN VON NORDAMERIKA. [The experimental division in the United States.]

A brief analysis of the tentative new infantry division. The author is surprised at the absence of infantry cannon and mortars with the infantry regiment. (They are now in the field artillery.—TRANSLATOR) He also is astonished at the weakness of the reconnaissance squadron.

7 May 1937

(71) DER OFFIZIER. [The officer.] Major Moszdorf

A brief study on the requirments of officers for the new German army. Only the best—only those possessing the necessary character and spirit of patriotic self-sacrifice need apply. The author states that the German universities are already complaining that the best types of students are no longer attending, and that they are going downhill intellectually. The Germans are building their new army from the bottom up. To fill vacancies in the higher grades, temporary officers of World War experience are detailed, but only for a limited time.

(72) ZUSAMMENARBEIT ZWISCHEN ARTILLERIE UND LUFTWAFFE. [Cooperation between aviation and artillery.] Major Köhler

The French are planning on making the autogiro a part of their balloon units. This is fairly sound, because the captive balloon is of little use in winds over 15 miles per hour, but it takes a minimum of such wind to keep an autogiro in the air.

Observation is essential to good shooting. Liaison between artillery spotting planes and the firing artillery is very important, difficult, and requires practice. It is not feasible, however, in times of peace to attach the artillery planes to the regiments, as they do not spend enough time on purely firing problems. But for exercises the same fliers should be detailed.

At present the artillery fliers also have reconnaissance and surveillance missions, and it is doubtful if there will ever be enough planes to relieve them of their dual responsibility. The question of protection by our own

pursuit is also an important question. No one can predict what it will be like if two nations oppose each other with approximately equal air power.

(73) WERDEN UNSERE SPÄHTRUPPS RICHTIG AUSGEBILDET? [Are our patrols being properly trained?] Lieut.Colonel von O., and Major Gleiniger

A controversial article written by two authors. One argues in favor of letting patrols use their judgment about attacking the hostile patrols while they are on a reconnaissance mission. The other author claims that this applies only to distant reconnaissance which has disappeared from the German Field Service Regulations, and that nowadays the reconnaissance detachment will send out patrols, which will always have a counter-reconnaissance mission in addition to their reconnaissance task. That patrols can not afford to let hostile reconnaissance detachments through for they can do tremendous damage to main bodies with their automatic weapons.

(74) KAMPFTRUPPENVERPFLEGUNG IM KRIEGE. [Rationing combat troops in war.] Captain Lenz

(75) WARUM GUTER PIONIERERSATZ? [Why the engineers need good recruits.] Captain Drück

A complaint that recruiting officers sometimes send men with flat feet, men unsuited for infantry, to the engineers. The engineer does everything the infantryman does and more. Engineers require mechanics, boatmen, construction workers, electricians, etc., and not bakers and barbers.

(76) WESEN UND GRUNDLAGEN DES TOTALEN KRIEGES. [The character and type of totalitarian war.] Captain Ruprecht

The author discusses how wars have grown from mere conflicts between the two armed forces to a combat between nations, involving all people. Just as an aerial attack against unfortified cities was considered terrible during the World War, so similar attacks in Ethiopia went unchallenged. As every city is the seat of certain industrial enterprises, all cities become strategic targets.

The economic phases of war are now just as important as the military. However, there are two phases to the word economy. One is industry, or the producing end, and the other is commerce, or the distributing end. Up to now industrial mobilization plans have concerned themselves (in Germany—TRANSLATOR) merely with industry. The author advises that commerce must be controlled as well, for by means of speculation, hoarding and other means, the enemy can be damaged commercially as well as industrially. (This has long ago been realized in the U.S.—TRANSLATOR)

(77) VOM SPANISCHEN KRIEG. [The Spanish War.] Colonel v.Xylander

14 May 1937

(78) DIE DEUTSCHEN OFFENSIVEN IM MÄRZ UND APRIL 1918 IN ENGLISCHER DARSTELLUNG. [The German offensives in March and April 1918, from the British point of view.] By v.B.

A review of the most recent volume of the British Official History of the World War, covering the operations in France and Belgium in March and April, 1918. The reviewer is primarily interested in the fairness of the publication, the plain-spoken criticism of the French, of the politicians at home, and of the Imperial Defense Committee. From the German point of view they envied the British because they had relatively no supply problem. Whereas, on the German side horses were dying for lack of grain, and there was no gasoline for motors; the British had cavalry galore, and were able to move their reserves in busses. That is the principal reason why the reviewer believes the Germans were unable to exploit their victories in 1918. He also states that the British soldier was a stubborn enemy on the defensive, and praises him as compared with the French.

(79) GEDANKEN ZUR WEITERENTWICKLUNG DER PANZERABWEHR. [Thoughts as to the further development of antitank defenses.] Captain Brandt

The problem of placing antitank guns on self-propelled mounts can be solved according to the author by not abandoning the split trail, which could be towed behind the motor. Then if the gun were needed in a defen-

sive position it could be lifted by two men onto the trail. If held in reserve it would be highly mobile by being mounted on a motor vehicle. All that would be necessary would be to provide the present 37-mm gun with a swivel pin.

The author suggests that the regimental antitank companies be armed by an automatic cannon of 20-mm (cal. 80), as many tanks are still vulnerable to those projectiles, and to equip the division battalion with the 37-mm on self-propelled mounts. Both would also be available as antiaircraft weapons.

(80) VERLEGEN DES RÜCKZUGES. [Cavalry in encircling pursuit.] v.Gonnermann

An historical illustration of the pursuit tactics by Egon von Schmettow's cavalry corps against the Russian, 14-18 July 1915. The operation was a failure, but the author gives in detail the reasons, and states that the same principles which were applicable then would be applicable to an independent highly mobile force, sent on an encircling mission to cut off the enemy. He states that the cavalry was too weak in numbers and lacked fire-power, and also had to furnish its own security.

(81) MEHR VORSICHT! [Be careful!] Lieut.General Marx

In connection with a recent series of articles and a book called, "Somme," this well-known German military author draws some lessons: Organization is a grand thing, but do not overdo it. He says that whenever units are reduced, the front-line rifle companies hold the bag. Headquarters, staffs, and special service units continue to operate full force; office clerks are never reduced, but riflemen are.

(82) ALLGEMEINBILDUNG. [General education.]

Army officers require a basic education. But what is education? It is knowledge, experience, judgment, and character. Frederick the Great said: "What is the good of living, if one just lives on? What is the good of seeing if one does not accumulate facts in one's memory? What good is experience if it is not made use of by means of analysis? Experience must be fortified; you have to think about them, and by philosophic contemplation open up new fields of thought. These thoughts and their results are the indications of an active mind." He also said: "He who knows how to arrange his time, has time for everything." The author believes that this sort of basic education is all important in the modern army officer.

(83) ZU "AUSBILDUNG MIT WECHSELNDEM LEHRPERSONAL." [Training with changing instructors.] Lieut.General Boltze

This article is in reply to a recent one in which troop training methods were advocated where specialist instructors trained the troops, who wandered from terrain area to terrain area during the course of the training day. General Boltze quotes his many years of experience, and states that the old method of making the squad leader responsible for the training of his squad (a few specialists excepted), gives him the pleasure and satisfaction of seeing them progress. The author believes that the suggested plan has not proven itself, but the existing training scheme has. The secret of a well trained unit lies in the quality of its noncommissioned officers, and not in the officer alone.

(84) VERBILDUNG VON FEUERSTELLUNG NACH HINTEN? [Communications to the rear from battery positions.] Captain Koch

A discussion of the requirements of communications from battery positions to its supply and rear echelons. The article discusses the various means now available, and recommends the use of dogs. He states that a trained dog, having been led over the route once will deliver messages more promptly than a man, is not as vulnerable, does not fear rifle or gun fire, and is faster and more reliable than any other means. They could be carried on the combat train and all it would require would be two men designated as trainers and to care for these animals.

MILITARY ENGINEER

May-June 1937

(1) THE GREAT FLOOD OF THE OHIO. Captain Strong
(2) HIGH WATER IN THE LOWER MISSISSIPPI. Major Moses
(3) THE CHEMICAL WARFARE SCHOOL. Captain Rowan
(4) THE ART OF CAMOUFLAGE. Major Barker
(5) MILITARY MINING OPERATIONS. Major Trounce
(6) TIENTSIN AND THE BOXER REBELLION. Major Colby
(7) EARLY NAUTICAL INSTRUMENTS. Lieut.Commander Bassler
(8) THE FIRST TRANSISTHMIAN PASSAGEWAY. Kirkpatrick
(9) STRATEGIC MINERAL SUPPLIES. 10. MICA. Major Roush
(10) CHANGING SAPPER SOLDIERING. Captain Young

July-August 1937

(11) THE FIRST BATTLE OF KUT. Major Reynolds, Royal Artillery
(12) THE "AMERICA" OF AMERICA'S CUP. Major Robinson, Jr.
(13) EXPERIENCE FOR WAR. Captain Chorpening
(14) EUROPEAN INTERNATIONAL ALIGNMENTS. Brown
(15) STRATEGIC MINERAL SUPPLIES. 10. MICA. Major Roush
(16) STATE-WIDE HIGHWAY PLANNING SURVEYS. Colonel Pancoast
(17) CONCHAS DAM CONSTRUCTION CAMP. Lieutenant Foote
(18) THE ITALIAN CAMPAIGN IN NORTHERN ETHIOPIA. Captain Lorence
(19) THE NEW ASSAULT BOATS. Captain Young
(20) FLOOD CONTROL PROJECT—LOS ANGELES COUNTY. Major Wyman, Jr.
(21) ENGINEERING AND DESIGN FOR LOS ANGELES FLOOD CONTROL. Captain Cruse
(22) AN EXPERIMENTAL BAMBOO TRUSS. Lieutenant Kumpe

MILITARY SURGEON

May 1937

(1) PHYSICAL ENVIRONMENT AND EFFECTIVE MAN POWER. Mills
(2) GARBAGE RACKS IN THE CONTROL OF FLIES. Captain Forsee
(3) AN AMERICAN WORLD WAR HOSPITAL CENTRE IN FRANCE. Colonel Barrage
(4) HANDLING OF AN EXTENSIVE OUTBREAK OF ATHLETE'S FOOT ABOARD SHIP. Lieut.Commander Sargent
(5) DENTISTRY IN THE ARMY. Major Boston
(6) ON MARCHING EFFICIENCY. Lieut.Commander Steindler

June 1937

(7) A STANDARD TECHNIQUE FOR THE BACTERIOLOGICAL EXAMINATION OF EATING UTENSILS. Cumming
(8) A MOSQUITO CONTROL PROGRAM. Captain Leedham

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(9) MEDICAL ASPECTS OF THE ITALO-ETHIOPIAN WAR. Sir Aldo Castellani
(10) THE OLDEST HOSPITAL IN AMERICA. Lieut.Colonel Hume
(11) MILITARY READING AS A HOBBY. Captain Long
(12) GUNSHOT INJURY OF EYES. Dr. Hendricks

NAVAL INSTITUTE PROCEEDINGS

May 1937

(1) NAVAL POWER AS A PRESERVER OF NEUTRALITY AND PEACE. Captain Knox
(2) VETERANS OF JUTLAND. Robinson

(3) WORLD WAR LOSSES OF THE UNITED STATES NAVY. Lieut.Commander Gosnell
(4) SOME NOTES ON OLD GUNS. Commander Simons
(5) THE MERCHANT MARINE PERSONNEL PROBLEM. Lieutenant Stapler

June 1937

(6) CALIFORNIA SEICHES AND PHILIPPINE TYPHOONS. Leypoldt
(7) DANGEROUS DOUBTS. Lieut.Commander Sheridan
(8) WHY SHOULD THE UNITED STATES HAVE AIRSHIPS? Lieut.Commander Gilmer
(9) TWO TUGS AND A FREIGHTER. Hanks
(10) A NEW AVIATION INSURANCE PLAN. Ensign Merrill
(11) THE HUMAN MACHINE IN DEEP-SEA DIVING. Captain Brown

July 1937

(12) HARBOR HUNTING IN ALASKA. Captain Ellicott
(13) NOTES ON ALASKA PILOTING. Lieutenant Farwell
(14) LIFE IN THE ALEUTIN ISLANDS. Lieut.Commander Lockhart

PIONIERE (Germany)

By Major F. During, Infantry

February 1937

(1) PIONIERE UND TRUPPENFÜHRER. [Engineers and troop leaders.] Major v.Ahlfen
(2) KAMPF UM FLUSZLINIEN BEI RÜCKZUGSBEWEGUNGEN. [The fight for river lines during withdrawals.] Major Günther, Retired

The author gives an account of the crossing of the Marne by the right wing of the German Seventh Army in July 1918, east of Chateau-Thierry. The infantry crossed the Marne on 15 July and advanced on 16 July to the French forward position, only to find that the enemy had withdrawn to a strong second position. Unable to advance farther without artillery support and being exposed to French counterattacks in front and flank, the German Seventh Army was compelled to fall back across the Marne. This withdrawal was carried out in an orderly manner during the nights 18-19 and 19-20 July, without being noticed by the French who advanced cautiously and concentrated their artillery fire on the abandoned German positions. The author describes in detail the bridging and ferrying work carried out by the eight divisions taking part in these operations. He concludes by stating that rivers should be divided into two classes, those over 100 yards, and those under 100 yards wide. The limiting length of footbridges is 100 yards and this limit may have to be reduced if the velocity of the stream is high. Three or four crossings should be established and maintained for each division. Crossings in continuation of main roads should be avoided.

(3) AN- UND ABMARSCHWEGE. [Bridge approaches and exits.] Captain Hartung
(4) AUSBILDUNG DER PIONIERE IM GEFECHTSDIENST. [Training of engineers for combat.] Captain Meltzer
(5) DIE FORTS VON VERDUN. [The forts at Verdun.] Colonel Jesse

QUARTERMASTER REVIEW

May-June 1937

(1) THE STORY OF CHEESE. Prepared by Kraft-Phenix Cheese Corporation
(2) LONGSTREET—GENERAL LEE'S WAR-HORSE. Major Yenchar
(3) THE U.S.A.T. "REPUBLIC." Major Marshall
(4) ARLINGTON NATIONAL CEMETERY. Prepared in Office of Memorial Branch, O.Q.M.G.
(5) AMERICAN MEMORIALS ABROAD

(6) SUPPLY DIVISION, O.Q.M.G. Brigadier General Warfield
(7) NATIONAL DEFENSE AND PEACE. Dr. Healy
(8) QUARTERMASTER STOREHOUSE OF KNOWLEDGE

RESERVE OFFICER

April 1937

(1) SKY FIRE IN SPAIN. Major Fleming
(2) MACHINE GUNS GROW UP
(3) ANTITANK DEFENSE

May 1937

(4) THE ARMY AND NAVY SERVE AMERICA. Major Jamison
(5) GERMANY'S "FORT BENNING." By Major General "A"
(6) CHARACTERISTICS OF MODERN WAR. Major Fleming
(7) THE THOMASON ACT. Lieutenant Allen

June 1937

(8) ARMY AND NAVY MANEUVERS, HAWAII. Major Fleming

July-August 1937

(9) A SENIOR MEDICAL OFFICER ON A WORLD WAR TRANSPORT. Colonel Burrage
(10) MILITARY TRAFFIC CONGESTION. Major Fleming
(11) BATTLE OF GUADALAJARA, 1937

REVUE DE L'ARMEE DE L'AIR (France)

By Lieutenant Colonel L.H. Brereton, Air Corps

January 1937

(1) COMMENTAIRES ET SOUVENIRS D'UN PILOTE DE L'AVIATION FRANCAISE DES DARDANELLES. [Notes of a French pilot in the Dardanelles campaign.] (I) Captain Garsonnin

A study of the campaign in the Dardanelles covering the period from the naval operations preceding the landings, the landing of 25 April 1915, and the resulting siege operations.

(2) RECHERCHES DE LA "SPERRY GYROSCOPE CO" SUR LA RÉDUCTION DES PARASITES DANS LE REPÉRAGES ACOUSTIQUE DES AÉRONEFS. [Study of parasite noise in the Sperry air sound ranging instruments.] House

February 1937

(3) LA MISE EN OEUVRE DES GRANDS AVIONS. [Operation of large aircraft.] (Editorial)

For a bomber of 18 tons gross weight, the following crew is proposed as a minimum:

Combat crew (total 7): Captain, navigator and bomber; 1st Pilot; Radio operator and electrician; Crew chief mechanic; 3 machine gunners.

Ground crew (total (16): 4 First mechanics; 2 Second mechanics; 4 Riggers (2 First and 2 Second); 2 Electricians; 3 Armorers (2 First and 1 Second); 1 Instrument mechanic.

(4) ESQUISSE D'UN PROGRAMME DE MATÉRIEL POUR L'AÉRONAUTIQUE MARITIME. [A study of type aircraft for the naval air arm.] (I) Captain Barjot

A discussion of aircraft of the Navy air arm, with an attempt to show the lack of proper coordination between the tactical and technical viewpoint.

(5) COMMENTAIRES ET SOUVENIRS D'UN PILOTE DE L'AVIATION FRANCAISE AUX DARDANELLES. [Notes of a French pilot in the Dardanelles campaign.] (II) Captain Garsonnin

(6) LA GUERRE AÉRIENNE EN ESPAGNE. [Air operations in Spain.]
The following notes were made by two French officer pilots serving with the Loyalist troops:

Equipment and Personnel (Rebel).—At the beginning of July, Spanish aviation of a total strength of approximately 180 airplanes consisted of about 50% pursuit planes (Newport 52 and Breguet 19). In the first days of active operations, approximately 75% of the personnel became disaffected and joined the rebels. Since this time, personnel and equipment have been replaced by well trained replacements from Italian and German sources equipped for the most part with German and Italian aircraft.

German and Italian Equipment.—During the months of September and October when the air advantage of the rebels was evident, their methods of employment included for the most part the direct support of the ground forces. Immediately prior to the attacks of the ground troops the combat pursuit aviation was employed against the hostile front-line elements with machine guns and light bombs (approximately 20 pounds). Such action was usually completely successful against the hostile combat troops which were poorly organized, poorly sheltered, and badly equipped.

By the middle of October it is estimated that the rebels had approximately 200 aircraft, of which 2/3 were pursuit (Heinkel, Arado, and Fiat) and 1/3 were bombers (Savoia-Marchetti and Junkers). This strength appears to have been maintained until the middle of January in spite of serious losses, due to the replacements which had been shipped in to Spain during the Civil War.

The Junkers (JU 52), which was converted from a civil transport plane, has very poor defensive power. It has no forward gun tourelle. Of the two rear gun tourelles the upper fires towards the rear and sides, the lower toward the front only. The Savoia-Marchetti (SA 1), which is better armed, appears to have tourelles which are difficult to maneuver. Bombers of either of these types if attacked when alone by two or more pursuit planes have usually been destroyed.

The fire-power of the pursuit planes (Heinkel and Arado with two machine guns) is excellent. The Fiat (CR 32) is extremely vulnerable to machine-gun fire forward due to exposure of the oil and water radiators. In addition, the gas tanks located under the fuselage are unprotected and practically all of this type of plane which have been shot down have caught fire before crashing.

German pursuit pilots usually operate in patrols of three and have excellent maneuverability. Their method of attack against bombardment is usually to attack by single plane from underneath and in rear, in the blind spots of the rear gunners. One attack only is made at a time by each member of the patrol in succession, after which the patrol is reformed out of machine-gun range. Italian pursuit tactics, which have not followed this system, have submitted the Italian pursuit to serious losses.

Of the rebel bombing raids against Madrid, that of 17 December appears up to the time of writing to have involved the largest numbers. The formation was comprised of 25 three-motored Junkers supported by 23 Heinkel pursuit planes.

In the Balearic Islands the intervention of Italian aviation ten days after the debarkation of government troops was decisive. Twenty bombardment planes based on Sardinia attacked the landing forces with bombs and machine guns and forced them to completely evacuate their position. At the end of December this Italian force was at Majorca on the landing field of Arsenal de Palma. In the Madrid sector the landing field at Avila, northwest of Madrid, has been reserved exclusively for the German air forces and no one except Germans are allowed access to the base.

Equipment and Personnel (Loyalist).—With the Loyalist forces the obsolescent Breguet and Newport equipment, which was available at the outbreak of hostilities, proved itself to be ineffective. This equipment consisted mainly of obsolescent models with little or no military value and was good for nothing except to take up hangar space. A small number of modern French military airplanes bought without armament and equipped in Spain with Vickers machine guns and old bomb racks comprised the

available aviation of the Loyalist forces until the end of October. At this time a considerable number of bombardment and pursuit airplanes were procured from Russia. They were operated by Russian personnel and from October the air strength of the Loyalists compared favorably with that of the rebels both as to equipment and personnel.

Two-thirds of the equipment procured from Russia was pursuit aviation of the types I-15 and I-16. The remaining one-third was bombardment aviation known in Russia as the type SB.

The I-15 is the small Boeing airplane (similar to the U.S. Army F-12 equipped with the Wright Cyclone 650-730 horse-power motor not supercharged). These aircraft are constructed in Russia under manufacturer's license, and are equipped with a two-bladed metal propeller. They are armed with four machine guns, .30 caliber synchronized, equipped with radio and for instrument flying, non-retractable landing gear, speed range 65 to 220 miles per hour, brakes manually operated, exceedingly maneuverable, endurance 2 hours and 30 minutes.

The I-16, of which there are comparatively few, is a low wing monoplane with flaps, a very short fuselage, a retractable landing gear, and hand brakes, Wright Cyclone motor supercharged above 2,500 yards, metal propeller with two blades, maximum speed 275 miles per hour, two machine guns mounted in the wings, endurance in excess of 2 hours (this also appears to be an airplane of American origin and is believed to be a modification of the United States Army P-26 Boeing). The SB bomber is an American monoplane, built under manufacturer's license in Russia, and is an adaptation of the Douglas transport. It has a retractable landing gear housed behind the motor necelles. It is powered with two Hispano-Suiza motors model 12 Ybrs. This is a tri-place airplane, extremely maneuverable, with a speed in excess of 270 miles per hour, endurance with 1,200 pounds of bombs approximately 5 hours. The machine gunner-radio operator in rear has two machine gun stations, one on top of the fuselage and one on the bottom. This type of bomber operates day or night and without pursuit protection.

The pilot personnel, operating airplanes of high performance with which they are thoroughly familiar, have shown a high degree of skill against pursuit attack under all circumstances.

For the first time in active operations, personnel has been equipped with parachutes. They have functioned excellently throughout. However, whenever it has been necessary for personnel to use their parachutes in the course of air combat, they have been promptly shot while in the air by their adversary. As a result, as far as possible, the technique of falling within 600 feet from the ground before opening a parachute, is being followed.

The greatest possible use is being made of all means of camouflage for concealment against air attack. This is being done in a much more extensive manner than heretofore, utilizing specially trained personnel for this purpose.

The antiaircraft artillery of both German and Russian origin, the most recent of which is mounted on swift tractors, has proven to be excellent. The Russian equipment apparently resembles the German very closely.*

Since the month of October on the active fronts, air warfare has been to some degree similar to that of the World War in 1918. Bombing missions consisted of from 4 to 6 heavy bombers protected by pursuit formations in flights of 3 or 4 planes. The rebel pursuit planes appeared to be the Fiat (CR 32) with two machine guns firing a mixture of armor-piercing, tracer and ordinary ball cartridge. The Heinkel has characteristics and performance similar to the above, with the exception that the Fiats are more maneuverable and the Heinkels are better climbers. The general depot for rebel aircraft at the beginning of October was in the vicinity of the village of Caceres. The operating landing fields are generally in the vicinity of the

*(It appears that this equipment is neither very numerous nor very efficiently operated in view of the daylight air operations which have been carried out at low altitudes, i.e., 3,000 yards.—TRANSLATOR'S NOTE)

hostile main columns as at Talavera, Medina del Campo, pursuit and bombardment operating usually on the same fields. Since October the number of bombers in a formation was usually 8, supported by a pursuit force of 8 to 12 airplanes. The average altitude of day bombardment was 2,500 yards. The accompanying pursuit usually operated in 3 echelons, the first at the altitude of the bombers, the second 1,000 yards higher, and the third between 4,000 and 5,000 yards, never higher than 5,500 yards. The pursuit pilots encountered in action were uniformly well trained in formation flying, fire and combat. They fought invariably in small formations and consistently refused single combat where they were usually outclassed by their adversaries with equipment possessing a greater climbing speed. On the other hand, the super-charged Loyalist pursuit planes were at a decided disadvantage in combat at low altitude.

Day bombardment aviation is at a severe disadvantage in combat against pursuit. In general, such combats have occurred when the accompanying pursuit has been withdrawn from the support of the bombers. The most effective means of avoiding pursuit combat and attacking the bombers directly has been for the Loyalist pursuit to attack the bombers during their return from their missions by approaching at exceedingly low altitudes for purposes of concealment, and striking them at a time when the supporting pursuit was not in the immediate vicinity. The most successful direction in which to launch attacks is from underneath and in rear. Large bombers are particularly vulnerable when equipped with water-cooled motors and it has proven exceedingly hazardous to employ them on day missions without adequate pursuit support. In view of the vulnerability of bombers to day attack, it would seem desirable to give additional protection to the pilot by armor around his pilot's seat.

The damage accomplished to metal aircraft by armor-piercing bullets is considerable. Bullets piercing the fuselage frequently dislodge large pieces of metal and auxiliary equipment which do considerable damage to personnel. The holes caused by this type of projectile are frequently 20-cm and more in diameter. The more rapid the bomber the less vulnerable it is to attack. The importance of high speed outweighs all other considerations or protection, including the necessity for a number of tourelles, machine guns, and other details of construction which may reduce the speed. As an example, the author refers to the Douglas bomber on which has been mounted one improvised tourelle whose speed has enabled them to carry out all missions up to this time (the middle of October) without loss.

Pursuit aircraft of high performance cannot be operated except by very well trained personnel. Their high speed of landing requires large airdromes of good surface which cannot be found in active operations. In addition it is exceedingly difficult to keep the brakes in proper adjustment under hard service conditions. The installation of wing machine guns is unsatisfactory. They cannot be re-armed during combat nor can jams be cleared.

Loyalist.—The Loyalist bombers are very vulnerable to air attacks from the side. Attacking pursuit cannot be destroyed with certainty unless the defender withholds his fire until the pursuit has approached to a range of 50 yards. When this is done the defending fire has met with unqualified success.

Super-chargers have been unsatisfactory in the Loyalist service. The reason has been the comparatively low altitude at which most operations take place—less than 3,000 yards.

The method of operations of Germans who are apparently charged with the direction of the rebel air operations, is to employ pursuit to the greatest extent in direct support of the ground troops which imposes operations at altitudes of from 100 to 2,000 yards. The method of operation is for large flights of pursuit to concentrate an attack against ground troops with machine guns and small bombs. This attack is continued until it is believed that the demoralization of the enemy has been achieved, after which the infantry launches its attack. Commanders of the Loyalist front-line troops have stated that it is impossible to force machine gunners to

fire on enemy airplanes flying at low altitudes and attacking the ground with machine guns and small bombs.*

Conclusions.—Due to the incomplete training of pursuit pilots in time of war, high-powered pursuit airplanes will be exceedingly difficult to operate without excessive losses and with a maximum of skill. The instruction of pursuit pilots for modern equipment should be of at least six months duration. The pilot should be able to concentrate all of his attention against his enemy in combat. With the present equipment of high-powered, supercharged motors and small sensitive aircraft, the pilot must not only fight his enemy but devote a large part of his effort to fighting his own airplane. The tractable landing gears are a source of great danger. They are easily damaged by rifle fire, in which case both pilot and plane are lost on landing or the pilot takes to his parachute and the plane is destroyed.

Upkeep and maintenance under service conditions would indicate that airplanes constructed with steel frames and wood or fabric covering are much easier to maintain than are all metal aircraft. All metal aircraft when extensively damaged must have a general overhauling, whereas the composite construction permits many repairs to be effected on the airdrome. The author recommends the construction of a type of light, easily handled monoplace plane which could be used in direct support of the ground forces or as interceptors for enemy bombardment.

March 1937

(7) L'AVIATION ET LES CHARS DE COMBAT. [Aviation and tanks.] Chief Engineer Rougeron

A comprehensive study of the employment of combat aviation as an antitank weapon. The question of antitank cannon versus tank armor, and possible developments of both, are discussed, with particular reference to the ballistic qualities of aircraft cannon. The efficacy of the 37-mm cannon against existing types of tank armor is cited. The author presents the thought that antitank action will be the most efficient way by means of which combat aviation can directly support the battle on the ground, and envisages the possibility of revolutionizing present conceptions of mechanized force employment due to the capabilities of air forces against mechanized forces.

(8) ESQUISSE D'UN PROGRAMME DE MATÉRIEL POUR L'AÉRONAUTIQUE MARITIME. [A study of type aircraft for the naval air arm.] (II) Captain Barjot

(9) COMMENTAIRES ET SOUVENIRS D'UN PILOTE DE L'AVIATION FRANCAISE DES DARDANELLES. [Notes of a French pilot in the Dardanelles campaign.] (III) Captain Garsonnin

REVUE D'ARTILLERIE (France)

By Major R.G. Tindall, Infantry

January 1937

(1) BATTERIES D'ACCOMPAGNEMENT. [Accompanying batteries.] Lieut. Colonel Rousseau

A continuation of the discussion prevalent in the French army on the subject of whether such accompanying batteries should be an integral part of the infantry or of the artillery. The author prefers a battalion of accompanying batteries as part of the division artillery. He likes the new matériel suggested by the late General Challeat, the 75/47 accompanying gun.

(2) HASARD ET RÉGULARITÉ. PROPOS PHILOSOPHIQUES. [Chance and regularity; philosophical discussion.] General Vouillemin

(3) DIALOGUES SUR L'ARTILLERIE TECHNIQUE. [Technical artillery dialogues.] (I) Lieut.Colonel Filloux

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*(Attention is invited to the fact that properly organized, equipped, and operated antiaircraft defenses have been completely lacking in most front-line units throughout the period of operations covered by these observations.—TRANSLATOR'S NOTE)

(4) LE TRANSPORT DES MUNITIONS PAR VOITURES AUTOMOBILES. [Transport of munitions by motor vehicles.] Major Fayet

(5) LA JUMELLE, APPAREIL FIXE D'OBSERVATION. [The field glass as a fixed means of observation.] Major Wels

Discussion of means of improving the efficacy of field glass observation by a light mount.

February 1937

(6) CONDITIONS DE RÉUSSITE DE L'OFFENSIVE. PUISSANCE DU FEU, LIAISON INTIME DES ARMES. [Conditions for a successful offensive. Fire-power and close liaison of arms.] General Buchalet

The author discusses the attack of a hastily organized position held by first-class infantry. He presumes that contact with this position has been gained and verified. He points out the characteristics of a modern defense: a greatly increased number of excellent automatic weapons, the majority of which are disposed for flanking fire and are echeloned in depth (but not arranged on successive lines), a comparatively uniform density of these weapons throughout the depth of the position with a relative weakening of the barrages and final protective lines in front of the main line of resistance, increased depth of positions and the appearance of the antitank weapon. After briefly discussing the importance of counterbattery, and pointing out that an attack can be nailed to the ground and the troops participating put out of the picture for weeks by the sole action of well-commanded artillery, the author takes up the effect of the hostile infantry weapons. There always will be some weapons disposed for frontal fire. These he considers can be dealt with by the infantry firing line, the infantry supporting weapons and by shrapnel fire from artillery immediately opposite. The extent of surface covered by shrapnel bursts in such case constitutes a great advantage. The real difficulty is dealing with weapons disposed for oblique or flanking fire for infantry and shrapnel fire have little effect against them. Moreover such weapons will only go into action at the last minute.

This fact, and the continuity of infantry resistance to be expected during the advance causes the author to rule out successive concentrations as a method of support in an attack against any serious resistance in depth. There are only two choices for the artillery, the rolling barrage if the attack has no tanks, close support of the tanks' action if the attack has tanks.

The rolling barrage, preceded by a coming fire of shrapnel, is effective but has two major drawbacks. The first is the enormous requirements of matériel. The author suggests that since these requirements are based on maximum cadence of the 75-mm gun during an extended period, that the adoption of a light howitzer (he suggests 90-mm) would permit the cadence to be increased, and the number of weapons necessary on a given front to be decreased. He considers that mobile armored artillery observation posts, similar to tanks, using radio for communication with the batteries, will help solve the second problem, the difficulty of synchronizing the barrage and the infantry attack.

The author then considers the support of a tank attack. Today, he insists, the tanks will be massacred unless they fight in close liaison with other weapons. If they try to go it alone, they will find themselves in the same position with respect to the antitank guns that the French riflemen of 1914 were with respect to machine guns. He does not consider that a rear echelon of tanks can be very effective in protecting a forward echelon. The tanks' real reason for existence is to neutralize in time the hostile weapons which escaped the artillery preparation and supporting fires, and which otherwise will check the attack. Consequently the author insists on careful arrangements beforehand between infantry, artillery and tanks Without great fire-power and close liaison between these arms no success can be gained. The real problem for the artillery, he concludes, is the closest possible support of a well-controlled attack. The light division howitzer will permit the reduction of this distance in all cases to less than 100 yards.

(7) SUR LA PRÉPARATION THÉORIQUE DES TIRS. [Theoretical fire preparation.] Captain Hecquet

(8) DIALOGUES SUR L'ARTILLERIE TECHNIQUE. [Technical artillery dialogues.] (II) Lieut.Colonel Filloux

(9) NOTE SUR LE PLAN PERSPECTIF. [Note on the perspective plane.] Lieutenant Astier

(10) APERCUS SUR LE GROUPE D'ARTILLERIE DE CAMPAGNE ALLEMAND. [A glance at the German field artillery battalion.] Captain Tarle

(11) APPAREILS DE MESURE D'ANGLES, SIMPLES ET DE POIDS RÉDUIT. [Simple, light, angle measuring instruments.] Major Wels

March 1937

(12) RÉFLEXIONS SUR L'ARTILLERIE ET LE MONTAGNE. [Thoughts on artillery in mountain warfare.] Colonel Ardaillon

(13) DIALOGUES SUR L'ARTILLERIE TECHNIQUE. [Technical artillery dialogues.] (III) Lieut.Colonel Filloux

The final installment of a series of discussions dealing largely with the adoption of an artillery system.

(14) RESTITUTION DES PHOTOGRAPHIES AÉRIENNES DANS LE GROUPEMENT. [Restitution of aerial photographs in the groupment.] Lieutenant Cartron

(15) ATTAQUE DU FORT DE SOUVILLE. [Attack of the Souville fort.] Colonel Thierry

An episode of the battle of Verdun by an eye witness.

(16) LA MOBILISATION DES FACULTÉS DE L'OFFICIER D'ARTILLERIE DE CAMPAGNE. [Mobilization of the resources of a field artillery officer.] Captain Bertin

A discussion of the necessity of training officers in resourcefulness so as to enable them to cope with unexpected situations.

REVUE DE CAVALERIE (France)

By Major L.K. Truscott, Jr., Cavalry

January-February 1937

(1) LA QUESTION DE L'ESSENCE DANS LES GRANDES UNITÉS DE CAVALERIE. [The question of gasoline in the large units of cavalry.] Commandant Arlabosse

The author discusses the gasoline requirements of the larger cavalry units, and indicates the imperative necessity for an adequate gasoline supply for all motor units. He discusses supply by tank trucks and by drums, and by a concrete example, illustrates a practicable method of supply.

He concludes that the impetus of supply must come from the rear; that the question of gasoline is a staff problem, but that it may become an important command decision, if for any reason, there is not enough gasoline for all units.

(2) LA BATAILLE DE LA SICKACK ET L'ÉTENDARD DU 2E CHASSEURS D'AFRIQUE. [The battle of Sickack and the standard of the 2d African Chasseurs.] Lieut.Colonel Aubier

The occasion for this excellent account of the Battle of Sickack, and the campaign which preceded it, is a recent ministerial order which authorizes the substitution of "La Sickack, 1836" for "Sebastopol, 1857" on the standard of the 2d African Chasseurs, a regiment that played a decisive part in the battle.

The account is a description of preparations for and conduct of a colonial campaign in mountainous country against a semi-civilized enemy. It is worthy of study because it illustrates and emphasizes many of the principles that are applicable to this special operation even in this modern age.

The Battle of Sickack was the decisive victory which terminated the first colonial operation of Bugeaud, whose campaigns form a most brilliant part in the history of French conquest in Africa.

The author outlines the general situation in Algeria and Oran at the time Bugeaud was assigned to command. In general, the French were

able to hold the northern borders of these districts with difficulty, and could venture away from the intrenched camps along the coastal region only by fighting. When Bugeaud was sent out with three regiments, the French had suffered several reverses, with the result that the enemy forces under Abd-el-Kader practically controlled the country except for the seacoast and the inland town of Tlemcem in which a French colonial ally was confined.

The author describes in considerable detail Bugeaud's ideas for warfare in mountainous country against a semi-civilized enemy, and the thorough preparations that he made for the campaign. On 7 June, the day after he landed, Bugeaud assembled his commanders and informed them that he was going to rid the "columns of the artillery and encumbering baggage that hindered their marches and prevented pursuing and surprising the enemy." Keeping only pack artillery, he discarded artillery, all ammunition wagons, baggage wagons, and all vehicles that until then had been used for transport. His very reduced trains were composed of camels and mules. He considered 14 days' rations sufficient for such campaigns; the train carried 10 days, leaving 4 days to be carried by individual soldiers.

Bugeaud believed that colonial warfare required thoroughly seasoned troops, inured to hardships; he considered that regiments brought from France could become fit only after thorough seasoning, and after weeding out men weak in body and mind to the extent of nearly half their strength.

Four days after landing, Bugeaud took the field and began his preliminary operations which the author describes in some detail. These operations consisted of a series of feints and maneuvers, characterized by intensive marching and avoiding the enemy, in which his purpose was twofold: first, to weed out the unfit and to thoroughly train his own command; second, to lead his adversary to seek the decisive battle, which Bugeaud would give only at the time and place of his own choosing.

He spent a month in these preliminary operations, weeded out the unfit, and satisfied himself as to the fitness of his own command. During the latter part of this time, he once marched around the Emir Abd-el-Kader, who held the gorges between Tlemcem and Tafna, by a circuitous route through the mountains. When he decided that the time was appropriate to seek the decisive battle, he marched from Tafna, again detoured Abd-el-Kader, who abandoned his position in the gorges and moved to meet Bugeaud on the Sickack, the ground Bugeaud had chosen for the decisive battle.

For the engagement, Bugeaud's force consisted of about 11 battalions of infantry (5,500), the 2d African Chasseurs and about 500 douairs (1,100 cavalry), 2 pieces of mountain artillery, a train of 500 camels and 300 mules; total combat strength about 6,600 men. Opposing Bugeaud, the emir had about 4,200 infantry, and over 5,000 cavalry; total combat strength between 9,000 and 10,000 men, of whom one-third were equipped, armed, and trained like Europeans.

The account of the battle is extremely interesting. The maneuvers and dispositions are explained clearly and in detail, and illustrated with a very good sketch. An interesting point in connection with the battle is that Bugeaud apparently considered that in order to draw the emir into the battle, it was necessary to allow him to reach the plateau on the opposite bank of the Sickack, which the French could have reached easily before him. The result was that Bugeaud undertook the dangerous operation of forcing a defile with the main body of the enemy in front of him, and a large body of hostile cavalry on his rear.

The operation succeeded and the emir's force was almost totally destroyed, largely because Bugeaud employed the 2d African Chasseurs at the appropriate time and place to reap the full fruits of victory.

In summarizing, the author states, in part:

"But it is in the military point of view above all, that it is becoming to bring it to light; for if its limits are narrow, its teachings are abundant, and should not sink into oblivion.

"It offers, in brief, the nearly complete synthesis of the principles of war: prudence in preparation; energy in decision; speed in execution.

"It shows that it is necessary to undertake nothing without having a plan, and without having communicated it to all, so that all cooperate in the

accomplishment of the common idea, without which, any incident can obscure the end, shake confidence, and paralyze impulsion.

"That is the normal part.

"It shows again how one can and should subordinate the immediate and secondary objectives to the cardinal and permanent objective, which should always be to beat the adversary, and for that to seek the decisive battle which alone will annihilate his emboldened forces; how one can and should utilize mobility, maneuver, for leading to the battle at the time and place that one will have selected.

"That is the strategical part.

"It shows finally how, on the terrain of combat, one can and should judiciously employ the advance guard, withdraw opportunely the rear guard under protection of an echelon previously established, pass from the defensive to the offensive, assure intimate liaison and close collaboration of the three arms.

"That is the tactical part.

"In short, it is, on a small scale, a complete model.

"And when one thinks that these troops were in part the same, and in part not as good (being younger), than those who sustained the disasters of Sidi-Yacoub and Macta, one cannot keep from measuring the preponderant, and that is to say, boundless, influence of the personality and value of a chief."

The article is worthy of consideration, particularly in connection with study of warfare of the nature described.

(3) COUPE MOTOCYCLISTE DITE DE "L'ARMISTICE." [Motorcyclist cup called the "Armistice."] By X . . .

Comments on the race or test so named, for motorcycles, both solo and sidecars, recently conducted by the Motorcycle Club of France.

(4) LES CHARS ANGLAIS LES 20 ET 21 NOVEMBRE 1917 À LA BATAILLE DE CAMBRAI. [The British tanks at the Battle of Cambrai.] (II) Major Bourgoin

This concluding installment describes the action from about 8:30 AM, 20 June, when the British reached the "blue line," or their first objective, to the evening of 21 June, when British general headquarters gave up the offensive for lack of reserves with which to continue.

By 10:00 AM, the British reached the "brown line," the German intermediate position, which was the British second objective, except at two points, Lateau Wood and Flesquieres. Lateau Wood, in which the Germans had perfected their antitank defense, held out until about 12:30 PM, when almost surrounded, the garrison surrendered. Flesquieres held out during the day 20 June, and was finally evacuated by the Germans during the night.

Fog, which had shrouded the operation, lifted about 10:00 AM, and cleared the situation for the Germans, enabling them to improve their fires. In spite of this fact, the breakthrough was practically complete except at Flesquieres and Lateau Wood shortly after noon, but by this time all British reserves of infantry and tanks were practically exhausted. The cavalry was brought forward late in the afternoon, but since there were no tanks to support it, the cavalry was checked by German machine-gun and artillery fire. Aside from the brilliant exploit of a single squadron, the cavalry was relatively ineffective.

On 21 June, the British command planned to have the III Corps consolidate the ground gained on 20 June, and continue the operation with the IV Corps. However, orders were issued so late that the attack did not begin at the time and with the coordination ordered, there were insufficient reserves and very few tanks, and German reinforcements had begun to arrive. Consequently, the attack failed.

In summarizing, the author states that the British did not have sufficient tanks to attain the objectives selected, and that tank dispositions lacked depth; that with more depth, the obstacles of Lateau Wood and Flesquieres could have been taken rapidly by maneuver of reserve elements; finally, that the battle is justly considered a brilliant English victory, and a model for the employment of tanks.

(5) CHRONIQUE AUTOMOBILE: CHENILLES OU ROUES. [Automobile chronicle: Tracks or wheels.]

In the preceding issue the author discussed the theory of construction of cross-country vehicles. In this issue he discusses characteristics from the military point of view especially as applied to the traditional missions of cavalry.

Speed.—Under this heading, the author states that average speed, rather than maximum speed, is to be considered. On roads: speed in convoy and speed in reconnaissance. In varied terrain: speed of approach and speed of combat. He discusses practical speeds for both wheel and track vehicles.

Clearing obstacles.—The author states that the most frequent obstacle is variable terrain, on which track vehicles have an advantage. On multi-wheel vehicles, however, pressure is so distributed that these vehicles can cross most obstacles that the track vehicles can get over. He considers the relation of weight, number of wheels, diameter of wheels, and slopes, to the ability of clearing obstacles.

Aptitude for tactical maneuver.—This he states is the ability which permits observation of terrain and easy use of arms. He considers wheel and track vehicles of similar weights, in encumbrances and in ease of protecting vital parts.

Resistance to wear and tear.—The author compares wheel and track vehicles in consumption, upkeep, and resistance to wear and tear, giving wheel vehicles an advantage.

After a comparison of the speed of troop movements by motor, he thinks that cavalry, in order to perform its missions of security and reconnaissance, will require correspondingly greater speed than the troop motor elements, and that only multi-wheel vehicles will provide the eventual solution.

REVUE D'INFANTERIE (France)

By Major R.G. Tindall, Infantry

January 1937

(1) LES DIABLES BLEUS. [The Blue Devils, or Chasseurs.] General Gamelin

(2) DE L'INFLUENCE DES TERRAINS MONTAGNEUX SUR LE CHOIX DES AXES D'OPÉRATIONS D'ORDRE TACTIQUE. [The influence of mountainous terrain on the choice of axes of tactical operations.] General Dosse

(3) GUERRE DE MONTAGNE EN AFRIQUE. [Mountain warfare in Africa.] General Changarnier

(4) GÉNÉRALITÉS SUR LES OPÉRATIONS EN MONTAGNE. [General ideas on mountain warfare.] Lieut.Colonel Reynault

(5) TACTIQUE EN MONTAGNE. LE COMBAT OFFENSIF DES PETITES UNITÉS: CAS CONCRET DE GUERRE. [Mountain warfare tactics. Offensive combat of small units; actual experience.] Lieut.Colonel Cazeilles

(6) TIR EN MONTAGNE DES ARMES DE PETIT CALIBRE. [Small arms fire in mountain warfare.] Lieut.Colonel Paille

(7) CHARS EN MONTAGNE. [Tanks in mountain warfare.] Lieutenant Chazalmartin

(8) LE BARRAGE PRINCIPAL EN PLAINE ET EN MONTAGNE. [The principal barrage, or final protective line of fire, on the plains and in the mountains.] Lieutenant Rocolle

(9) NOTES SUR LES SECTION D'ECLAIREURS-SKIEURS. [Notes on the platoons of scout-skiers.] Captains Metz and Faure

(10) LA VIE DU SOLDAT EN MONTAGNE. [The life of the soldier in mountain warfare.] Major Toureng

(11) UN SAUVETAGE EN MONTAGNE. [A mountain rescue.] Lieutenant Pégorier

(12) LE SERVICE DE L'INTENDANCE EN GUERRE DE MONTAGNE. [The Quartermaster service in mountain warfare.] Planes

February 1937

(13) LE RÔLE SOCIAL DE L'ARMÉE D'AFRIQUE. [Social role of the African army.] Lieut.Colonel de Monsabert

A discussion of command problems with native forces.

(14) LES CHARS ALLEMANDS PENDANT LA GUERRE. [German tanks in the World War.] Lieut.Colonel Perré and Lieutenant Pourailly

A detailed study of some ten engagements in which German tanks participated during 1918. The action of each individual tank is studied, and for the more important engagements maps are provided showing movements of each tank. The German tanks developed frequent mechanical defects and the German command did not use the tank to advantage. On one occasion, for example, two German tanks were put out of action by German infantry, which had not even been notified that they would be supported by tanks, and mistook German tanks for enemy vehicles.

(15) MÉTHODE D'INSTRUCTION DE L'INFANTERIE. [A method of training infantry.] Major de Liocourt

(16) LA CORRECTION DE SITE DANS LE TIR MASQUÉ LOIN DU MASQUE. [Site correction in masked fire when far from the mask.] Captain Cazenave

A discussion of a technical problem in machine-gun firing.

(17) THÈMES TACTIQUES ALLEMANDS. [German tactical problems.] Major Quénot

Conclusion of discussion of a series of German tactical problems involving the approach to contact of an infantry battalion.

March 1937

(18) RÉFLEXIONS SUR LE TRAVAIL EN LIAISON AU COMBAT. [Thoughts on teamwork in battle.] General Dufieux

(19) PRISONNIERS. [Prisoners.] Lange

An episode of the battle of Verdun.

(20) UN MOT SUR LES TRAVAUX DE CAMPAGNE. [A word on field fortifications.] General Barrard

Practical suggestions on the detailed construction of shelters and machine gun emplacements.

(21) MISE EN PARALLÉLISME DES MITRAILLEUSES. [Placing machine guns parallel.] Major Wels

(22) UNE DIVISION DE RÉSERVE AU DÉBUT DE LA GUERRE: LA 72E D.R. EN AOÛT ET SEPTEMBRE 1914. [A reserve division at the beginning of the War: the 72d Reserve Division in August and September 1914.] Major Debeugny

The author discusses the three engagements of this French reserve division, on 24 and 25 August, 1 September, and during the Battle of the Marne. The operations are followed in considerable detail. The comments made on the August offensive action were that operations were neither conducted, supported nor tied together. The division commander endeavored to attack simultaneously over too wide a front and constituted scattered detachments to whom he attached all his artillery. Orders were received too late and the attacks were hastily prepared. Naturally they achieved nothing.

Regarding the combats of 1 September, the author notes the trifling results that are obtained in wooded terrain by partially trained troops. Only troops which have specialized in such matters are capable of obtaining considerable results in woods. On this day one French attack was comparatively well planned and supported and was executed with vigor. It did not succeed, however, and the author attributes its failure to an absence of artillery preparation and the fact that the troops had to progress about two miles over open terrain to reach their objective. The French artillery was unable to hold down the German fire for the length of time which this progression required. A line of departure which was closer could have been reached under cover, had a slightly different direction been selected for the attack. In 1914 the disadvantage of long advances over open terrain were not understood.

The author approves the dispositions of the divisions in its initial advance to contact on 6 September during the battle of the Marne, but insists that the ensuing attempt to attack on a five-mile front with parallel columns directed along avenues favorable to progression, but separated from each other by dangerous open spaces, could only result in repeated

partial checks. He suggests a solution by which the division commander could have put his weight into one attack on a front commensurate with his means.

The errors made on 6 September were repeated during the following days and the division never achieved any real success. The division commander did not make his scheme of maneuver sufficiently clear but let his separate columns do as they pleased. Lack of information and preconceived ideas led him to disperse his troops including all his artillery so that he had no means of influencing the combat. Orders were too vague and did not take into account the delays necessary to preliminary movements by subordinates, hence the attacks were always hasty and disjointed, or else they could not be launched on time. After repeated checks the same maneuver was tried again with no modification of conception or procedure.

The troops had the habit, when checked, of withdrawing far to the rear in order to organize another attack. These withdrawals were always costly and created a dangerous reflex in the minds of the troops. There was no thought of maintaining contact.

The author insists that the actions of the troops and leader should not be judged too severely, because they were merely attempting to apply the doctrine they had been taught. He says, however, that those who now have the fruit of their experience would be quite culpable if the lessons were forgotten. He then mentions a few lessons which the early days of the war brought out—lessons which are particularly important for partially trained troops.

In the approach march a unit should be extended in width and echeloned in depth to the greatest extent compatible with the maintenance of cohesion and the exercise of control. The enemy will never be reconnoitered far enough away or on too large a front.

However, contact once gained (it should be remembered that an interior unit is being considered), the front on which an attack is made must be in strict relation to the material means available. One should not attack everywhere. Instead, the attack should be made in a well-selected direction with the support of all available fire-power.

Infantry must have as reflexes the ideas of liaison, obtaining information and rendering reports, and the conservation of contact.

Victory can only be the result of the cooperation of all, and the infantry particularly must insure close liaison with other arms. The artillery does not fight its own private war, as was falsely advocated by many pre-war prophets; its first duty is to support the infantry.

Courage today suffices even less than 20 years ago unless it is based on a complete military education and this can only be obtained in exercises with troops.

(23) La figuration des feux par la procédé "Balambois." [Representation of fires by the Balambois method.] Captain Duféy

REVUE DU GENIE MILITAIRE (France)

By Lieutenant Colonel P.C. Bullard, Infantry

January-February 1937

(1) Une guerre de mines en 256 après J.-C. Le siège de Doura Europos d'après les fouilles récentes. [A war of mines in 256 A.D. The siege of Doura-Europos, according to recent evacuations.] du Buisson

Recent excavations at the ancient town of Doura-Europos, on the Euphrates River, show that, during the siege of the town by the Persians, the attackers used several mines, while the defending Romans used countermines. There is little or nothing to learn from the utilitarian point of view, but the story of the mine warfare, as drawn from the ruins and as illustrated by some thirty photographs and sketches, is logically supported and is interestingly related.

(2) Le fonctionnement et la conduite des installations de ventilation avec surpression. [The operation of ventilation systems under pressure.] Captain Roubinet

Attention is invited to the growing importance of ventilation in military works. It has had a very considerable application in the construction of the new French system of frontier fortifications.

In campaign, the use of collective means of protection, such as gas-proof, ventilated shelters, is of value. Such shelters are particularly important for such vital installations as command posts, telephone centrals, and aid stations.

Furthermore, because of the rapid development and technical progress of aviation in recent years, the menace of gas attack extends at present to a large part of the national territory. This leads more and more to the construction, in peace-time, in the interior of the country, of shelters protected against gas, not only for the civilian population but also for the establishments of the principal services of the army. In these shelters, ventilation will play an important role.

In ventilation under pressure, it is particularly to be noted that the intakes, at definitely known points, can be protected by installations for purifying the air. The air within the structure is under pressure, and is thus constantly pushing outward, through many small leaks, against the outer air and against any gas which may be outside. In ventilation by suction, the reverse would be true, so that dangerously contaminated air might be drawn into the shelter.

This 60-page technical and mathematical study treats of fans, pipes, methods of operation, effects of various influencing factors, the calculation of output, modifications required to existing installations, operating troubles, and repairs.

(3) NOTE AU SUJET DE L'EXPLOITATION DES CARRIÈRES D'ALLUVIONS AVEC UN OUTILLAGE MOBILE. [Notes on the exploitation of gravel banks with portable equipment.] Lieut.Colonel Rousseau

In campaign it is of importance to secure road material near where it is to be used and thus reduce rail and motor hauls. Gravel banks are especially useful and are easily exploited.

The general operation is simple; merely to loosen the gravel, using picks, crowbars, etc., and to sift it with shovels, forks and screens. The organization of a force of about 50 men for this purpose is described. The equipment, including screens, wheelbarrows, some light railway track and three or four cars, hand tools, and a few miscellaneous items (all listed in detail), are such as are usually available in the field. With 50 men, it may be expected that about 250 cubic yards of road material, of various sizes, will be obtained daily.

REVUE MILITAIRE GENERALE (France)

(Formerly, **"Revue Militaire Francaise"**)

By Major C.R. Moore, Corps of Engineers

[The December 1936 issue of the "Revue Militaire Francaise" announced that the magazine would be discontinued with this issue, to be succeeded by the "Revue Militaire Générale," an independent organ, under the direction of General Paul Azan, formerly Chief of the Army Historical Service.

The "Revue Militaire Francaise" has been published for the past 15 years in cooperation with the French General Staff.—EDITOR]

January 1937

(1) APPEL AUX JEUNES. [A call to youth.] Marshal Pétain

(2) INDÉPENDANCE ET IMAGINATION. [Independence and imagination.] Marshal d'Espérey

(3) LA MARINE DANS LA DÉFENSE NATIONALE. [The navy in national defense.] Vice Admiral Lacaze

(4) L'UNITÉ DE L'ARMÉE. [The unity of the army.] General Weygand

(5) LA MYSTIQUE DE NOTRE CORPS D'OFFICIERS. [The symbolic ideal of our corps of officers.] General Debeney

(6) HIER ET DEMAIN. [Yesterday and tomorrow.] General Gamelin

(7) LE CONCOURS DES MARINS. [The cooperation of the navy.] Vice Admiral Durand-Viel

(8) L'ARMÉE DE L'AIR DANS L'ENSEMBLE DE LA DÉFENSE NATIONALE. [The air force in combined national defense.] General Féquant

(9) LES HAUTES ETUDES DE DÉFENSE NATIONALE. [Advanced studies in national defense.] Vice Admiral Castex

(10) LES TROUPES COLONIALES ET LA DÉFENSE DE L'EMPIRE COLONIAL FRANCAIS. [Colonial troops and the defense of the French colonial empire.] General Billotte

(11) L'ARMÉE DE L'AIR ET LES AUTRES ARMÉES. [Relation of the air force to the army and navy.] General Armengaud

(12) L'ENSEIGNEMENT SUPÉRIEUR DANS L'ARMÉE DE L'AIR. [Advanced instruction in the air force.] General Berger

February 1937

(13) FRANCE, SOUVENIR. [France, a remembrance.] General Gamelin

A short extract from the address of General Gamelin at Metz, 17 January 1937, in memory of the forces of 1870.

(14) CONSIDÉRATIONS SUR LA CAMPAGNE ITALO-ÉTHIOPIENNE. [Remarks on the Italo-Ethiopian campaign.] General Bollati

In this brief article General Bollati, of the Italian Army, reviews in a compact and interesting manner the preliminary organization for this campaign, the logistical system employed, the strategy of the campaign, and the tactical developments, indicating the part played by the separate combat arms.

(15) NÉCESSITÉ DE L'UNION AÉRIENNE DE DÉFENSE ANGLO-FRANCO-BELGE. [Necessity for an Anglo-French-Belgian union for aerial defense.] General Armengaud

(16) L'OFFENSIVE ET LA DÉFENSIVE AVEC LES ENGINS BLINDÉS. [Mechanized forces in the offensive and defensive.] Colonel Mainié

The author, in this issue, reviews the principles and generally accepted conclusions for the use of mechanized forces both in the offensive and the defensive. The discussion forms a general introduction to future articles which are to deal with the use of mechanized units in specific situations.

Mines and antitank weapons supplemented by the use of both natural and artificial obstacles are the main elements of the defense. "Tank chasers" are being considered, but they have a tendency to develop into another tank by the addition of armor. The employment of tanks to fight tanks may be expected in the future.

Mine fields require time and personnel, but are an effective element of the defense. The artillery will have to prepare lanes through these fields for attacking tanks. The mine barrier should be separated from wire entanglements so that hostile artillery cannot destroy both at once. Owing to the difficulties of observation it will be more difficult to destroy a mine field with artillery, than it is to destroy wire entanglements.

As a result of theoretical calculation, Colonel Mainié has prepared a table showing the number of antitank weapons required per kilometer of front. The number needed depends upon the density and speed of the hostile tanks. A minimum is 3 weapons per kilometer; 12 antitank guns per kilometer appear desirable to furnish protection against an attack over open terrain. Where means are insufficient for full protection, the available means should be used to protect certain zones in which will be concentrated the reserves, command posts, artillery, etc. Antitank defense should be organized in depth, and the use of all available active and passive means should be fully coordinated.

Tank attacks should be preceded by a thorough reconnaissance of the terrain and of the defensive measures of the defender. Much of this information will be obtained from air photographs.

(17) RÉFLEXIONS SUR L'ÉDUCATION MORALE DE L'OFFICIER. [Reflections on the moral education of officers.] Captain Tabouis

(18) LE SYSTÈME FORTIFIÉ ALLEMAND DE 1871 À 1918. [The German system of fortifications from 1871 to 1918.] Lieut.Colonel Montigny

March 1937

(19) L'AVIATION ET LA DÉCISION DE LA GUERRE. [Aviation and the decision in war.] General Niessel

Aviation played an important part in the last war and will play a greater role in the next. There are those who believe that aviation alone can bring about a decision. Can this be expected? The only way of preventing aerial invasions is to destroy hostile air power before it becomes dangerous. To do this, airplanes must be attacked on the ground; airdromes and airplane factories must be destroyed. This result is by no means easy to accomplish. No nation will ever have enough airplanes to attack all important objectives simultaneously. In concentrating on hostile aviation other objectives of equal importance may be neglected.

If, at the beginning of a war, both sides use their aviation to bomb sensitive points in the rear, both may be successful, greatly handicapping the ground forces of both sides, but there is no such thing as complete and permanent control of the air. One can never be certain of having obtained decisive results by air.

In addition to its independent mission the air force can render great assistance to ground forces, both in observation and combat. The only way to obtain final victory over a patriotic people who are willing to make sacrifices is by occupation of the country. This can not be accomplished by air attack alone, although the power of air attack may be decisive in making such an occupation possible.

(20) L'APPUI DE L'INFANTERIE DANS L'OFFENSIVE EN GUERRE DE MOUVEMENT. [The support of infantry in the attack in open warfare.] General Brosse

This article deals with the support of the infantry by its own weapons. Later articles are to cover the support of the infantry by the artillery with and without tank support.

(21) LA FRANCE DOIT ÊTRE FORTE SUR MER. [France should be strong on the sea.] le Bail

(22) L'ATTAQUE AVEC ENGINS BLINDÉS D'UNE POSITION SOMMAIREMENT ORGANISÉE. [The attack of a hastily organized position with mechanized forces.] Colonel Mainie

The object of this discussion is to apply the general principles set forth in Colonel Mainie's article in the February 1937 issue of "Revue Militaire Générale" to the attack of a hastily organized position between the Aisne and Serre Rivers located so as to obstruct an advance in the general direction: Laon—Chaumont-Porcien.

The problem is discussed ably and in detail. The author concludes that tanks are so dependent upon the nature of the terrain over which they are to operate, that they should not be committed until their passage over obstacles and the destruction of antitank mines are assured.

The initial phase of an attack by bounds is not changed by the presence of tanks; their action is tied to the line of combat, for their vulnerability is too great to permit them to spend much time on the field, unless followed at a short distance by the infantry, nor can they maneuver beyond the protective fires of friendly artillery.

Some authors think that the present characteristics of tanks will permit them to make a deep penetration at a single bound for the purpose of neutralizing the hostile infantry and artillery fire. The author believes that a defense organized in depth will break up the cohesion of such an attack and expose the vehicles to unnecessary and costly sacrifice.

Tanks may greatly assist the advance from objective to objective provided that:

(a) The infantry has cross-country vehicles for their heavy weapons and, when needed, armored personnel carriers.

(b) The artillery observers follow the tanks in armored vehicles in order to assure continuity of artillery support.

(c) Effective radio communication is maintained between the various elements taking part in the operation.

In order to operate beyond hostile barriers, means must be available to destroy hostile tanks by fire. The action of tanks against tanks will be

an essential element of exploitation in future battles. The best armed and best armored vehicle will overcome its adversary. We may see a development race corresponding to that of naval vessels since the middle of the last century.

(23) A PROPOS DE LA FORTIFICATION DE LA SUISSE. [The fortification of Switzerland.] Lieut.Colonel Montigny

Comments on an article by Colonel Reybold of the Swiss Army which appeared in the November 1936 issue of the "Journal militaire suisse."

(24) LE TRANSSAHARIEN. [The Transsahrian.] Squadron Chief Jarrix

Advocates the construction of a transsaharian railroad.

REVUE MILITAIRE SUISSE (Switzerland)

By Major T.R. Phillips, Coast Artillery Corps

January 1937

(1) LA DÉFENSE D'APRÈS LE S.C. 1927 . . . EN 1937. [The defensive according to Field Service Regulations, 1927 . . . in 1937.] Lieut.Colonel Montfort

The 1927 Field Service Regulations (Swiss) prescribed the principle of resistance in place as the basis of defensive combat. Fire-power, which constituted the primary means essential for the defender to oppose the progress of the assailant, took the form of barrages of which the more important ran in front of the principal position. Thus the study of the plan of fire determined the dispositions of the troops.

In a previous study, the author considered that in the organization of a battalion in defense, one company should cover the front of the battalion on the outpost line, rather than allowing each company to take responsibility for its share of the outpost. The advantage of this disposition lay in unity of command over a definite front, while it appeared that if the companies each furnished the outposts for their sector, it would be impossible for the company commander to exercise control over the outposts.

If, in spite of interdiction and barrage fires, the assailant penetrated the position, the reserves would repulse him by counterassaults and counterattacks.

In an epoch where science progresses, tactics is, more than ever, in perpetual evolution and it is a grave error to depend on formulas which are apt to age rapidly. The defense of 1927 is based on the attack by infantry supported by artillery. At the present time the more dangerous enemy is the hostile tank and airplane. The entire organization of a position for defense at this time, is a function of antitank defense and the uninterrupted band of infantry fire has lost considerable of its importance.

Even though there may be no danger of attacks by 10,000 or 15,000 tanks, as envisaged by General Eimansberger, among our neighbors we find that France has 3,000 tanks, Germany 2,300, and Italy 1,200. A large stream is the best obstacle against the tank attack; after this, swamps, forests and natural strong points. So the flanks of the defensive should be supported by natural obstacles and the position should canalize the zones of tank attack where its progress can be delayed and where means of defense can be accumulated. Obstacles should not be limited to the main line of resistance. On the contrary they should be echeloned in depth. Wherever natural obstacles are insufficient to canalize the action of tanks, the construction of artificial obstacles such as barricades, tank moats, flooded areas, tank mines, traps and barriers must be undertaken.

Obstacles are not efficacious unless they are covered by antitank fires and defensive fires against infantry. Antitank weapons should be echeloned in depth. The rapidity and power of the tank attack is so great that the main line of resistance cannot hope to stop it completely. A cannon may put one tank out of action, two tanks, three tanks . . . but not indefinitely. After one tank has been destroyed, the second confronts it, and the third may reach it and destroy it or pass beyond. Therefore, there must be a large number of antitank weapons to be sufficient. General Pichon proposes

three per battalion, together with a section for the regiment to guard the rear.

The antitank gun should be located so that its position cannot be turned by the machines it is combatting. To be out of the range of the fire of the tanks it should be in position at least 300 yards from the obstacles which delay the tank attack. The infantry defense will be superposed on the antitank defense. The antitank nests will be protected from the enemy infantry by our own infantry.

To summarize: the line of resistance, and in its depth, the position, should actually be determined, above all, by study to obtain the combination of obstacles to oppose the tank attack. The position should contain in the necessary depth a series of mutually supporting centers of resistance. The infantry plan of fire consequently becomes a function of the antitank dispositions. Even then it will have an ample continuity. It is essential that the company of infantry should not be too dispersed for control, since under this scheme control of fire is as important as having sources of fire. The requirement of control also demands that the infantry company maintain its own outposts in front of its sector. A company furnishing the outpost for a battalion front would be too widespread to be controlled by the captain. It would be lost as soon as an attack started, for the attack of tanks is too rapid to permit it to withdraw.

Three excellent illustrative dispositions are included in the article, together with drawings of various types of artificial tank obstacles.

(2) UN EXEMPLE DE LIAISON ENTRE LES OPÉRATIONS ET LES SERVICES DE L'ARRIÈRE. [An example of liaison between combat operations and the supply services.] Lieut.Colonel Anderegg

The operations of the German First Army in the early phases of the World War have been the subject of much writing, but little attention has been given to what took place in the supply service. When it is considered that the supply services of the First Army included 10,000 vehicles and 25,000 horses, it is readily seen that the daily movements of such a mass require narration and comment by themselves.

Colonel Jochim, Quartermaster General of the German First Army, has thus written a useful work, in describing the supply accomplishments behind the corps of the German First Army during the decisive days from the 5th to the 13th of September 1914.* It is of especial interest to the general staff and all officers of the services.

By regulation, the supply services of the German troops were the responsibility of the army corps; these had at their disposal to insure supply:

Combat trains, marching with the troops

Regimental trains, marching behind the divisions

Columns of munitions and trains, divided, for the march: in a first and second echelon; for combat: in an echelon of combat, a first echelon and a second echelon.

Munitions and supplies were brought by columns allotted to the depot services to the refilling points where the columns of the second echelon were supplied. By an exchange of columns between the different echelons, munitions and supplies arrived at the combat echelon, which organized a distributing point for the columns or vehicles from the front. All of these columns thus constituted mobile depots of munitions and food.

The length of the columns will give an idea of the importance of the supply services: while the troops of an active German army corps, marching on a single road, formed a column 19 miles in length, the regimental trains and the first and second echelons of the army corps had a length of 17 miles. It is obvious that in all of its movements, the First Army had to pay equal attention to its combatant troops and its supply columns.

On 4 September, the First Army which, in compliance with instructions from the high command, had obliqued towards the southeast to cut off the French from Paris, had reached and even passed the Marne with its cavalry

*"Die Operationen und rückwärtigen Verbindungen der deutschen 1. Armee in der Marneschlacht 1914," by Colonel Jochim, and English translation in C. & G.S.S. Library.

and four of its corps, while the IV Reserve Corps followed, west of the Ourcq, assuring the security of the flank from the direction of Paris.

The supply head of the First Army, initiatially at Düsseldorf, had been advanced little by little, and was installed on 5 September at Chauny, about 61 miles from the front. The parks and the convoys had followed the rapid advance of the First Army as well as they were able and were on the lines of communication of their respective corps about 25 miles in their rear.

On 5 September, the commander of the First Army intended to continue the pursuit to the south, but an order from the supreme command directed it to wheel between the Marne and the Oise on Paris, while the Second Army was to make an analogous movement between the Marne and the Seine. The IV Reserve Corps received the order to halt and the army commander prepared the change of front of his four other corps for the morning of the 6th. To execute the order of the high command, the army commander had to reverse his front, until then facing south, to the rear around his right wing. During this maneuver the troops had to pass through the zone of the supply services and the grave problem of General von Kluck is to execute this movement after having the supply services evacuate this zone without provoking disorder or interfering with the normal supply of his troops. He decided to bring the four army corps which were south of the Marne to the new front by a flank march behind the IV Reserve Corps, the latter remaining in place; on the new front the four army corps would thus be in the same order from west to east as before. It was sufficient to oblique the parks and convoys to the right and then west, to clear the region through which the troops were to move. At the same time this would bring them behind their respective army corps on the new front. The orders were issued for this to be done on the morning of 6 September.

Late in the night, the IV Reserve Corps announced that it had been attacked by superior forces and was forced to give way. The army commander then ordered the II Corps, the nearest to the IV Reserve Corps, to go immediately to the assistance of the former. Instead of being on the right wing of the new front, as intended, the II Corps would thus be on the left wing—the first breach in the plan of the army commander. But he believed that after having reinforced the IV Reserve Corps he would be able methodically to complete the change of front as planned. The movement commenced with the supply services which were to clear to permit the passage of the army corps. The second supply echelons were then on the Marne. The army had directed that, until further orders, the movements of the parks and convoys would be regulated by the general staff of the army and that as soon as the army was unscrambled the corps lines of communication with the supply head at Chauny would be reestablished.

To avoid disorder and perturbation in supply during the change of front, they undertook the direction of all the services of the rear, which normally were a function of the corps. To insure that everything was executed in accordance with the plan, the general staff officers were charged with directing and controlling the movements of the troops and convoys, especially during the passage of defiles.

During the day of 6 September, the army commander became aware of the gravity of the situation of the II and IV Reserve Corps on the Ourcq; consequently, he accelerated the march of the IV Corps (active) to make it reach the Ourcq during the morning of 7 September. At the same time the last two corps remaining on the southern front were attacked strongly and had to cover the right flank of the Second Army, which was also attacked; they were unable to reach the battlefield of the Ourcq until the evening, and even in part during the night, of the 8th, after forced marches of 36 to 43 miles. As soon as it was found that the original plan could not be applied as a consequence of the unforeseen changes in the situation, the army had ordered the regimental trains immediately to withdraw, the parks and convoys toward the north, well in the rear, so as to disengage the roads for the passage of the last two corps of the army.

On the front of the Ourcq the corps were mingled since divisions and even brigades had been forced to intervene at the most seriously menaced localities in the order of their arrival. It was thus physically impossible to

assure the supply of the corps by their organic columns and convoys, which had been withdrawn far in the rear toward the north. The army therefore placed automobile columns from the depot services at the disposition of the corps and gave the necessary orders to advance the munitions columns from the depots.

The change of front between the Oise and the Marne, as prescribed, has thus been executed but not in accordance with the intentions of the army commander, for the intervention of the French Sixth Army had upset not only the plan for the change of front of the corps, but also that established for the displacement of the parks and convoys.

On the evening of the 8th, the First Army commander gave his orders for the attack for the next day. It was to commence by a turning movement of the right wing. The regimental trains and the supply echelons continued their march to the rear to reform and to take their places in the rear of their respective corps. This movement was executed in the midst of friction and confusion of every nature, for in spite of the orders of the army, the corps had not taken all the necessary measures and certain echelons acted contrary to the orders given.

It was in this situation and in the course of the attack of the right wing of his army, that toward noon the army commander learned from Lieutenant Colonel Hentsch that the Second Army was falling back. It had received orders to retreat. This order was urgent; it was necessary at the same time to break off combat and get the parks and convoys behind the newly prescribed front. By good fortune for the First Army, most of its supply echelons were in a region situated on the east flank of the zone which the troops would have to traverse in their retreat.

The parks and convoys received the order to withdraw behind the Aisne and one division of cavalry was assigned for the protection of the lines of communication of the army toward the north. Taking into consideration the disorder which would be caused in the rear by this unexpected retreat, the army again ordered that the automobile columns of the depot services be placed at the disposition of the corps; besides supplies for the 10th were arranged for by having munitions and supplies brought to Soissons and the motor columns of the depots were advanced.

During the evening of the 9th, the disorder and jamming in the services of the rear was complete and interfered considerably with the retreat of the troops. Since the retreat was to continue on the 10th, the commander of the army artillery was charged with regaining order in the parks and convoys and of replacing them on the lines of communication of their army corps. To accomplish this the parks and convoys were taken under control on their passage over the Aisne and after considerable movements to the north of the Aisne the echelons found themselves on their assigned routes by the evening of the 10th. Most of the echelons were pretty well emptied; until they were filled the army had to assure the supply of its corps by use of the convoys of the depots; it also arranged for the supply of munitions by having all the depot columns advance as far as Soissons.

By the evening of 10 September, the army was again in the hands of its commanders, and the day of the 11th served for the reconstitution of the army corps and for continuing the placement of the echelons and trains on the lines of communication of their respective corps. At this moment the front of the army was south of the Aisne; the supply head was still at Chauny, about 25 miles in the rear, and the supply echelons on the roads about half way between the front and the supply head.

During the day of the 11th, three divisions were to act as rear guards south of the Aisne while the rest of the army crossed the river. The supply echelons were withdrawn still further in the rear and the army again charged itself with the responsibility of supply.

In two days the army commander had not only regained order in his corps, but also in the regimental trains and the parks and convoys. He still had to establish order in the depot services where the confusion was great as a result of the direct supply established with the front. Beginning with the 12th, supplies were to be reestablished normally, that is to say by the intermediary of the supply echelons and the regimental trains.

On 12 September the First Army was to follow the withdrawal of the Second Army; to do this it obliqued to the northeast and withdrew its right to prevent any effort at envelopment. The rear guards were withdrawn north of the Aisne and the supply echelons toward the rear, almost to the supply head.

On the morning of the 13th, the First Army was ready to repulse the attacks of the adversary, then commencing. The withdrawal of the right wing had required the unwedging of the lines of communication toward the northeast. The railhead, which was to have been transferred to Laon, remained at Chauny, on account of the arrival of the Seventh Army which included Laon in its zone. Chauny was very much exposed and required protection. The convoys refilled directly at the depots of the railhead, in order to permit the reestablishment of the depot columns, in view of the battle which seemed imminent and for which the army commander was preparing all the necessary supplies.

During eight days we have seen that a carefully prepared plan of operations and supply was completely destroyed by the adversary when he took the initiative. If the army commander nevertheless accomplished his task it was due to improvisations at every instant. With this example, one could easily conclude that carefully prepared plans are useless, because, most frequently, the adversary will not permit their execution, and consequently there will always be improvisation. This conclusion would be totally false. The establishment by the army commander of a complete plan of supply for a difficult operation, as well as having taken as the basis of his operations the possibilities of his supply services, denotes, in a commander, a perfect comprehension of the importance of supply in a modern army and a deep knowledge of the services of the rear. Such qualities are not always, paradoxical as it may appear, those of commanders. To be able to improvise it is necessary to know to the bottom the domain in which one wishes to improvise. Likewise, the plan which is prepared and cannot be executed serves not only as the base of all improvisations, but as the coordinating thread of all improvisation, and permits arrival, albeit by different routes, to the object proposed or prescribed.

If, during the battle of the Marne, the supply of the First Army had been assured, normally or by improvisation, and if the commander were able to repair the friction and disorganization in the rear and commence the battle of the Aisne with his services coordinated and ready to function, it was due, aside from the competence of the army commander, to the fact that *the direction of all the supply services was centralized in the general staff of the army* and in the hand of the army Quartermaster General, Colonel Jochim. Ordinarily the corps organized their own supply services, but in case of necessity, these services could be entirely centralized in the general staff of the army.

One of the main lessons to be derived is the necessity of a chief of all supply services in each large organization. Actually this function was supplied by the general staff, but the general staff is deficient in that they are not supply specialists and only serve on these duties for periods of a few years. It is equally as important to have central control of supply services as of command, and this should be obtained at any price.

Colonel Jochim concludes: "The movements accomplished on the Marne and the withdrawal to the Aisne constitute a perfect example of the close connection which exists between combat operations and the supply services and which cannot arbitrarily be thrown out. It is necessary, on the contrary, to proceed with profound studies, to prevision, to place the two in harmony, unless the combat operations are to suffer. Without assured supply the finest victories and all the devotion of the troops will serve nothing, for supply is the primary condition to conserve the combative attitude of the troops for the future operations of the army.

"Exercises in time of peace and map exercises fail to show sufficiently the friction and difficulties of war. The services of supply, in their ramified functions, cannot be represented as they are in reality; they are something indeterminate, at the beginning of war—something new and unaccustomed. This is why the study of military history should be pursued for in it are

found the sources of the combat aptitude of an army and how troops can be supplied without causing operations to suffer. One should have constantly in mind that there can be no invariable system of supply, that any system must be adapted to circumstances and given a useful and profitable form."

(3) LA NOUVELLE SECTION D'INFANTERIE. [The new infantry section.] Captain Nicolas

A comparison of the old and new infantry section of the Swiss Army. It discusses the organization, armament and employment of the section.

RIVISTA DI ARTIGLIERIA E GENIO (Italy)

By Major F. During, Infantry

December 1936

(1) RISERVE DI UOMINI E RISERVE DI FUOCO. [Employment of reserves.] General Vercellino

A discussion of the use of reserves (men and fire) in higher units in a meeting engagement.

(2) CONSIDERAZIONI SULL'ADDESTRAMENTO DELL'ARTIGLIERIA. [Employment of artillery in mobile warfare.] General Zanghieri

(3) MECCANIZZIAMO GLI ARTIERI. [Mechanization of sapper units.] Major Cappuccini

(4) SONO TORNATI I CANNONI DI ADUA. [Echoes of Adua.] Colonel Molinari

An account of the self-sacrifice of the Italian artillery in the disastrous battle of Adua on 1 March 1936. The Ethiopians captured some Italian guns, which have been recovered and are now placed in the colonial museum in Rome.

(5) INTERCETTAZIONE TELEFONICA CAMPALE. [Telephone interception in war.] Major Petrella

January-February 1937

(6) ACCENTRAMENTO DELLE ARTIGLIERIE, DECENTRAMENTO DEL FUOCO. [Centralization and decentralization of artillery fire.] Colonel de Stefanis

The general principles of centralizing artillery under a single command and decentralizing it by transfer to local commanders are discussed in this article.

(7) LA DENSITÀ DEGLI SCHIERAMENTI D'ARTIGLIERIA IN RELAZIONE AL PROBLEMA DEI RIFORNIMENTI. [The assignment of artillery and its problems of ammunition supply.] Colonel Zauli

The author discusses the question of ammunition supply for artillery and shows how it may impose limits on the distribution of artillery.

(8) STUDIO DEL RIFORNIMENTO MUNIZIONI DI UNA GRANDE UNITÀ IN ZONA PIANEGGIANTE. [Study of ammunition supply for corps artillery.] Colonel Orsi

(9) CONSIDERAZIONI CIRCA LA BALISTICA E LESIONI DELLE ARMI DA CACCIA E CIRCA LE PERIZIE GIUDIZIARI. [Ballistics for shotguns.] General Mattei

March 1937

(10) L'ARMA DEL GENIO NEGLI ANNI XIII E XIV DELL'ERA FASCISTA E DURANTE LA CAMPAGNA IN AFRICA ORIENTALE. [Engineers during the thirteenth and fourteenth years of the Fascist era.] (I) Lieut.Colonel Biagioli

This article being the first of a series of four, describes the engineer arm during 1935 and 1936, and the work it did during the Ethiopian campaign.

(11) STRADE E REPARTI DEL GENIO PER LA GUERRA DI MOVIMENTO. [Construction of military roads in a war of movement.] Lieut.Colonel Steiner

(12) PROTEZIONE DELLE STRADE DALL'INSABBIAMENTO. [Protection of roads.] General Maltese

ROYAL AIR FORCE QUARTERLY (Great Britain)

July 1937

(1) AIR STRATEGY—A BRIEF ANALYSIS OF THE BOOK ON "AIR STRATEGY." General Golovine
(2) VIEWS ON AIR DEFENCE. By the authors of "Air Strategy"
(3) HELPING THE PILOT. By J.C.C.
(4) PSYCHOLOGY AND THE ROYAL AIR FORCE. Prof. Bartlett
(5) THE IMPERIAL COMMONWEALTH: AN ESSAY ON BRITISH COLONIAL POLICY. Major Pemberton

ROYAL ARMY SERVICE CORPS QUARTERLY (Great Britain)

May 1937

(1) THE LOADING OF THE DIVISIONAL SUPPLY COLUMN AT S.R.H. AND S.R.P.
(2) EVACUATION AND REPLACEMENT OF R.A.S.C. M.T. VEHICLES IN THE FIELD
(3) THE CARRIAGE AND DISTRIBUTION OF PETROL FROM RAILHEADS TO FIGHTING UNITS
(4) THE PREPARATION AND CONDUCT OF ADMINISTRATIVE EXERCISES
(5) THE SUPPLY RESERVE DEPOT AND ITS RELATION TO CERTAIN ASPECTS OF PROVISION
(6) THE CONCEALMENT OF VEHICLES

ROYAL ENGINEERS JOURNAL (Great Britain)

June 1937

(1) TATTOO SEARCHLIGHTING. Lieutenant Muir
(2) THIS GRID BUSINESS. Captain Crone
(3) A COURSE AT BIGGIN HILL. Major Wakelam
(4) FLOODS IN FENLAND. Captain Heath
(5) THE SEVEN-LENS AERIAL CAMERA. Lieutenant Thompson
(6) THE SCIENTIFIC METHOD OF REASONING. Captain Wilson
(7) AN OLD TURKISH BRIDGE REBUILT. Captain Stileman

ROYAL TANK CORPS JOURNAL (Great Britain)

January 1937

(1) TANK BRIGADE TRAINING, 1936, IN RETROSPECT
(2) MOHMAND OPERATIONS, 1935
(3) TANKS IN THE KHOJAK MANOEUVRES, 1936
(4) A GERMAN FIELD ARTILLERY OFFICER'S EXPERIENCE AT THE FIRST BATTLE OF CAMBRAI
(5) THE FIRST TANK V. TANK DUEL—VILLERS-BRETONNEUX, 24TH APRIL, 1918
(6) THE DE MOLE TANK: AN AUSTRALIAN ACCOUNT
(7) MY EXPERIENCES IN THE AUSTRALIAN TANK TRAINING SECTION. By an Ex-Member
(8) LORD KITCHENER'S ATTITUDE TOWARDS THE TANKS. Major General Swinton
(9) ANTI-TANK DEFENCE. By Tankjager
(10) TANK EXPERIENCES IN THE CHACO WAR
(11) THE FUNCTION OF THE MOBILE DIVISION
(12) WHY A MEDIUM TANK?
(13) THE "I" TANK FROM AN INFANTRYMAN'S POINT OF VIEW

July 1937

(14) PALESTINE, 1936
(15) EMPLOYMENT OF TANKS ON THE INDIAN FRONTIER

(16) The Ipi Operations, December, 1935—January, 1936
(17) Unit training, Egypt
(18) No. 8 Armoured Car Company in India, 1923
(19) Tanks in the Spanish War
(20) The problem of the point
(21) The "I" tank: Another infantryman's point of view
(22) Mobile administration
(23) Tactics and design
(24) The further development of tanks
(25) A plea for the heavy tank
(26) The Battle of Amiens
(27) The first mechanical vehicle: Gugnot's steam artillery tractor, 1769
(28) The foundation of discipline in close-order drill

SIGNAL CORPS BULLETIN

May-June 1937

(1) Communication in the First Division. Major Autrey
(2) Signal training in the New Jersey National Guard. Major Parsons
(3) Organized Reserves, Second Corps Area. Major Forsythe
(4) Signal training of the New York National Guard. Major Rasor
(5) The Signal Corps pictorial service. Captain Lubbe
(6) The First Signal Company's participation in the Second Army maneuvers, Fort Knox, Kentucky. Lieutenant Cook
(7) History of Fort Monmouth. Staff Sergeant Bundy
(8) Army weather forecasters. Richeson
(9) The refresher course at Fort Benning. Colonel Eastman

July-September 1937

(10) Radio stations of the Seventh Corps Area. Staff Sergeant Calkins
(11) Seventh Corps Area telephone construction crew. Ray Blain, Telephone Plant Engineer, S.S.L.
(12) Signal Corps activities at Fort Leavenworth. Captain Clarke
(13) Evolution of the Post Telephone System at Fort Leavenworth. Charles F. Robinson, Electrical Assistant, S.S.L.
(14) A Signal Corps officer's experiences in the C.C.C. Lieutenant Buchak
(15) Seventh Corps Area C.C.C. communications. Captain Woolverton
(16) The Seventh Corps Area photographic laboratory. Pvt. (1st cl) Welcher
(17) Cipher busting in the Seventh Corpa Area, A.A.R.S. Colonel James
(18) The evolution of communication. Frank V. Rhodes, Consulting Engineer
(19) Reserve officer training in the Third Corps Area. Captain Swift
(20) C.C.C. radio communication in the Fourth Corps Area. Captain Phillips
(21) Signal activities during the 1937 flood in southern Illinois. Major Eliot

UNITED SERVICES REVIEW (Great Britain)

15 April 1937

(1) Strategy—and the Northern Hemisphere. Lieut.Colonel Baker

(2) WORLD MOBILIZATION AND ITS IMPENDING RESULT. Air Commodore Charlton
(3) NAVAL HISTORY REPEATS ITSELF. HAS THE LESSON REALLY BEEN LEARNT?

22 April 1937

(4) THE INFANTRY OF THE FUTURE. Lieut.Colonel Wilberforce
(5) AIR DEVELOPMENT IN THE FAR EAST. Air Commodore Charlton
(6) FRENCH NAVAL PROGRESS
(7) SEA AND AIR. DEFENSIVE VALUE OF THE "UNATTRACTIVE TARGET." Sir Herbert Russell

29 April 1937

(8) OBSERVING SPAIN ON SEA AND LAND. Lieut.Commander Saul
(9) THE INFLUENCE OF AIR POWER ON HISTORY. Air Commodore Charlton
(10) THE DECISIVE GUN. CANNON THE ARBITER IN SEA WARFARE. Sir Herbert Russell

6 May 1937

(11) THE KING AND THE NAVY. "SOVEREIGN OF THE SEAS" OWN SERVICE. Sir Herbert Russell
(12) KING GEORGE VI. AND HIS ARMY. Captain Macnamara
(13) BRITISH SOVEREIGNS AND THE SEA. Lieut.Commander Saul
(14) OUR CHANGING ARMY. Captain Griffith

13 May 1937

(15) BRIDGING THE GAP. Lieut.Colonel Wilberforce
(16) BRITAIN CAN WIN THE ARMAMENTS RACE. Air Commodore Charlton
(17) BRAINS IN THE ARMY. Colonel Beadon
(18) "FANTASTICS." IMAGINATIVE PICTURES OF MODERN WAR. Sir Herbert Russell

20 May 1937

(19) FATE OF THE BATTLESHIP ESPANA. Air Commodore Charlton
(20) JAPANESE SEA POWER. WHAT IS THE POLICY BEHIND IT? Sir Herbert Russell

27 May 1937

(21) HOLLAND AND EUROPEAN BAROMETER. Captain Macnamara
(22) DEVELOPMENTS IN CIVIL AVIATION. Air Commodore Charlton

3 June 1937

(23) ITALIAN REARMAMENT AND THE MEDITERRANEAN. Air Commodore Charlton
(24) ORGANIZATION OF THE FLEET AIR ARM. FRENCH NAVAL AUTHORITY ON ITS DIFFICULTIES. Dr. Rosinski

10 June 1937

(25) HOW AIR POWER IS INFLUENCING WORLD REARMAMENT. Air Commodore Charlton
(26) THE HIGH SEAS. NEVER-ENDING PROBLEMS OF INTERNATIONAL LAW. Sir Herbert Russell
(27) AMERICA'S NEW DREADNOUGHTS. Robinson

17 June 1937

(28) MILITARY DEVELOPMENTS IN RUSSIA. Captain Macnamara
(29) AIR DEFENCE: UNITY OR DUALITY? Air Commodore Charlton

24 June 1937

(30) IN THE HANDS OF THE PERSIANS. (I) Sir Frederick O'Connor
(31) RUSSIA'S DEVELOPMENT OF POLAR REGIONS. AN ADDED SAFEGUARD TO HER FRONTIERS. Air Commodore Charlton
(32) FIGHTING FLAGS OF THE BRITISH NAVY DURING THE GREAT WAR. Commander Mead

(33) STRATEGICAL BASES. WHAT REALLY DETERMINES THEIR VALUE? Sir Herbert Russell

1 July 1937

(34) TOWARDS SAFER AND BETTER FLYING. Air Commodore Charlton
(35) NAVAL CADET TRAINING. SHOULD THE COST BE REDUCED? Sir Herbert Russell
(36) IN THE HANDS OF THE PERSIANS. (II) Sir Frederick O'Connor

8 July 1937

(37) IS ROCKET FLIGHT POSSIBLE? Air Commodore Charlton
(38) IN THE HANDS OF THE PERSIANS. (III) Sir Frederick O'Connor
(39) "THE NEXT WAR"—IF IT COMES. WILL IT BE SHORT AND DECISIVE? Sir Herbert Russell

WISSEN UND WEHR (Germany)

By Major G.J. Braun, Infantry

January 1937

(1) WAFFENENTSCHEIDUNG UND WIRTSCHAFTSKRIEG. [Decisive military action and industrial warfare.] Admiral Gladisch, Retired

A discussion concerning warfare against enemy industries, and blockades in conjunction with the land operations to reach a decision in war.

(2) GEBIRGSKRIEG. [Mountain warfare.] Colonel v.Wittich, Retired

The author cites many historical instances where armies were compelled to cross mountain ranges in order to reach their objectives. He shows how these natural obstacles slow down operations and require especially trained troops for both offensive and defensive purposes. Prior to the World War only a limited number of trained Alpine troops were available. Since the War all the major and minor powers of Europe have developed this type of fighter.

He shows how cavalry and tanks are useless in mountain warfare. Motor equipment is limited to roads for supply, reinforcements, retreat or pursuit purposes. The air service is not as effective in mountain warfare as is generally believed, being hindered by the lack of emergency landing fields, effect of heavy clouds, fog, and sudden storms. Experience has shown that bombing activities are not effective and that the principal function of aviation is reconnaissance, delivery of messages and dropping supplies by parachute.

For mountain warfare troops need special clothing, equipment, and transportation. The officers should be athletic and the personnel recruited from mountain regions.

(3) DAS ENGLISCHE KRIEGSMINISTERIUM. [The British War Office.] Miller

February 1937

(4) DAS FELDHERRNTUM DES GROSZEN KÖNIGS. [The military leadership of the great king (Frederick).] Solger

(5) GEOGRAPHIE UND WEHRWISSENSCHAFTEN. [Geography and military science.] v.Niedermayer

(6) DIE VERWENDUNG DER ARTILLERIE EINER ANGRIFFSDIVISION IN DER DURCHBRUCHSSCHLACHT BEI ARMENTIÈRES APRIL 1918. [The use of the artillery of an assault division in the breakthrough at Armentières, April 1918.] Major General Wagner, Retired

The author describes the lack of training of the personnel in open warfare and the weakened condition of both men and animals as a handicap to be overcome. The 32d Division, to which the artillery belonged, had the mission to break through the hostile first and second lines at Rouges Bancs, moving north and securing the crossings of the Lys River between Houplines (inclusive) and Erquinghem (exclusive). On the first day the artillery fired 228,000 rounds, making the occupation of the first hostile position comparatively easy for the infantry. He describes how fog hindered observation from ground and air, and the boggy, shell-torn terrain slowed down

the artillery in its effort to keep up with the infantry. The author covers the entire action with descriptions of the obstacles which had to be overcome.

In order to assure complete surprise, there was no artillery registration fire prior to the onset of the preparatory fire. So complete was the surprise that the hostile artillery could not effectively reply until the Germans had crossed the Lys. The terrain difficulties and weakened transportation prevented the Germans from reaching their first day's objective at the scheduled time. The hostile artillery in Armentières was so effectively gassed that it was out of action.

In conclusion, the author calls attention to the advancement in communications since 1918, which in the future will aid the functioning of artillery. Weather permitting, the artillery commander or one of his staff officers should go up in a plane and make his reconnaissance to see where artillery support is necessary. Motorized batteries will get batteries into position faster than the horse-drawn, also the increased range of modern artillery permits more diversified use of same. In the future there will be more bombardments of rear areas augmented by bombing activities. Tanks will take up the barrage after it passes beyond artillery range. The author also feels that some artillery should be organically assigned to infantry units to develop, in peace time, the teamwork necessary to overcome the machine gun which is the infantry's most dangerous opponent. The nation possessing the best mechanical equipment and determination to win will be the future victor in battle.

(7) DIE SELBSTBEFREIUNG DER BESATZUNG VON MENIN IN DER NACHT VOM 29./30. APRIL 1792 ALS BEISPIEL FÜR DEN DURCHBRUCH ALS MITTEL DER SELBSTBEFREIUNG. [The self liberation from the siege by the garrison of Menin during the night of 29-30 April 1794, as an example of the breakthrough as a means of liberation.] Linnebach

March 1937

(8) DIE MILITÄRPOLITISCHE LAGE FRANKREICHS. [The French military and political situation.] Major Bertkau, Retired

(9) DER LUFTVERKEHR UND SEINE WEHRPOLITISCHE BEDEUTUNG. [Air transportation and its military and political significance.] Lieut.Colonel Knausz

The author describes commercial aviation as a post-war development in the realm of transportation. In his comparison of the effect of commercial aviation on present day transportation, he shows that aviation has not revolutionized transportation from the military and commercial standpoint nearly as much as had the railroads in the middle of the nineteenth century. At that time the railroads made troop concentrations, movements and supply service four times faster than was possible with the horse. At present aviation has accelerated that speed many folds.

Colonel Knausz explains that in the new field the sky is an open road unobstructed by terrestrial features which limited the operation of the railroads. He explains that aviation cannot replace the truck and the railroad because of the disproportion of the weight, pay load, and cost of operation. He states that they must augment each other.

Due to various technical features, the author feels that conversion of commercial aircraft for military purposes is not practical for the following reasons:

(a) Commercial ships need large landing fields.
(b) Lack quick climbing power.
(c) Lack ability to make quick changes in altitude.
(d) Changes in load will disturb center of gravity and make blind flying more difficult.

Politically, the author feels that commercial aviation forms the geopolitical life lines of a nation. They link colonies closer to the homeland and serve as excellent representatives in foreign countries. Where commercial air lines cut or parallel other nations' lines of communication, a distinct threat exists to the nation whose lines are cut. The author describes the air lines of England, Italy, France, United States, Japan, and Russia, covering the points mentioned above.

(10) ZUR TOTALITÄT DES ZUKUNFTSKRIEGES. [The trend toward total mobilization of population and industry in future wars.] Ambrosius

The author discusses the present trend of thought which considers the total mobilization of population and industry of a nation to the energetic prosecution of a war. This in turn, has developed another thought that in future wars there will be no distinction between combatants and non-combatants. Decisions will be sought behind the lines against highly populated industrial centers and large cities as well as on the front against the armed forces. He discusses this new policy pro and con, showing how in Spain it has caused needless slaughter of non-combatants and prisoners, and uncalled for destruction of property. This policy of attrition or extermination has its advocates and opponents and the author suggests a complete revision of the rules of land warfare as the best solution.

(11) DER ANTEIL BERITTENER TRUPPEN DES "AGYPTISCHEN EXPEDITIONSKORPS" AN DEM KAMPFE UM PALÄSTINA. [The participation of the cavalry of the Egyptian Expeditionary Corps in the conquest of Palestine.] Major Welsch, Retired

An excellent account of the three battles about Gaza in Palestine, accompanied by five maps. Emphasis is given to the cavalry participation in this campaign. The article is incomplete and will be continued in the next issue.

Section 5

Academic Notes

THE COMMAND AND GENERAL STAFF SCHOOL

REPRINT OF CURRENT SCHOOL MATERIAL, WHICH AFFECTS INSTRUCTIONAL PROCEDURE OR TACTICAL DOCTRINES

Instructional Organization

Commandant

BRIGADIER GENERAL C.M. BUNDEL, U.S. Army

Assistant Commandant

COLONEL F.W. HONEYCUTT, Field Artillery

Secretary

LIEUTENANT COLONEL F. GILBREATH, Cavalry

Directors

Regular Class.....COLONEL K.B. EDMUNDS, Cav.
Special Class and Extension Courses.....COLONEL C.I. CROCKETT, Inf.

Chiefs of Sections

I. Offensive Operations.....LIEUT.COLONEL J.B. ANDERSON, F.A.
II. Intelligence, History and Strategy.....LIEUT.COLONEL K.G. EASTHAM, Cav.
III. Defensive Operations.....LIEUT.COLONEL G.R. MEYER, C.A.C.
IV. Supply, Evacuation and Logistics.....LIEUT.COLONEL T.K. BROWN, Cav.
V. Miscellaneous.....LIEUT.COLONEL R.E. MCQUILLIN, Cav.

General Terrain Exercise No. 9

	Paragraphs
SECTION I.—Situation and First Requirement	1-3
II.—Second Special Situation	4-5
III.—A Solution of the Second Requirement	6
IV.—Discussion	7-13

SECTION I

Situation and First Requirement

	Paragraph
General situation	1
Special situation (Blue)	2
First requirement	3

1. GENERAL SITUATION.— *Maps.*—Strategic Map, Leavenworth, 1934, 1 inch=4 mile Leavenworth sheet. Special Map A, herewith.

b. Boundaries.—The Kansas River and the Missouri River east of Kansas City form the boundary between two hostile states, Red north, Blue south.

2. SPECIAL SITUATION (BLUE).—*a.* Blue war plans contemplate immediate invasion on the front: Topeka—Fort Riley (60 miles west of Topeka) for the purpose of containing Red main forces which are mobilizing west of the Missouri River, followed by a rapid advance of the Blue I Corps in the direction: Plattsburg—St Joseph.

b. Mission of the 1st Division.—The 1st Division, reinforced, preceded the remainder of the corps with the mission of capturing St. Joseph and facilitating the advance of the remainder of the corps.

c. Situation at 8:00 AM, 6 June.—(1) The 1st Division, marching from the vicinity of Woodruff, made contact early in the afternoon in the vicinity of Faucett with a hostile division marching from the north. Major General A decided to take up an active defense, defending with the 1st Brigade along the general line: road junction 516-J—Lone Star—crossroads 403-J—road junction 551-H. By 8:00 PM, the 1st Brigade was defending the position with the enemy in close contact. The 1st Squadron 1st Cavalry, opposed by hostile cavalry, had been unable to advance beyond Castile Creek. On the west flank, Blue reconnaissance elements had been unable to pass Sugar

Creek. Blue observation aviation had been unable to operate successfully because of strong enemy pursuit.

(2) The bridges at Platte City, Fort Leavenworth, and Leavenworth have been destroyed.

d. Events between 8:00 PM, 6 June, and daylight, 7 June.—(1) *Reports from the 901st Observation Squadron:*

(a) "Enemy troop movements observed at 9:00 PM in the area: Valley Chapel S.H.—Jones S.H.—DeKalb (generally 9 miles east of Atchison). Truck and tractor-drawn artillery observed in Atchison at 9:00 PM; at same hour motors were moving east across Atchison bridge."

(b) "At 10:00 PM, truck column about one mile long halted on road south of Armour with tail at Armour, and trucks moving east from Atchison on Highway No. 59."

(2) *Report from 1st Brigade at 12:30 AM, 7 June:*

"Enemy launched an attack south of Taos at 11:00 PM. Repulsed by 1st Infantry."

e. Events prior to 10:30 AM, 7 June.—(1) *Enemy attack.*—At daylight, 7 June, the enemy launched a frontal attack against the position occupied by the 1st Brigade. Shortly after daylight, strong hostile forces supported by light and medium artillery, and accompanied by tanks, attacked from the general vicinity of Simmons S.H. (1200 yards south of crossroads 651-H).

(2) *Remainder of I Corps.*—Major General A received information that the leading elements of the 2d Division would reach the Platte River between Edgerton Junction and Mellon Bridge about 11:00 PM, 7 June.

f. Situation at 10:30 AM, 7 June.—(1) *Own forces.*—At 10:30 AM, 7 June, Major General A, at his command post at New Market, knows that the following situation exists (see Special Map A):

The 1st Brigade is holding its position as shown. Its right has been driven back to the regimental reserve line, where it is holding with difficulty. The 1st Battalion 2d Infantry has suffered severely and has lost about twenty-five per cent of its personnel. Its units, badly disorganized, are mingled with the 3d Battalion 2d Infantry, which was brought up hurriedly. The other reserve battalion of the 1st Brigade, the 3d Battalion 1st Infantry, has been ordered to move at once to the vicinity of Strafford to be prepared to support the right flank.

The 2d Brigade, moving to an area on the south flank to launch a counteroffensive, lost direction, and, through misunder-

stood orders, was committed prematurely shortly after daylight. Five battalions were engaged in an effort to check the enemy attack. They were driven back to the line shown. Four battalions, badly disorganized and with units intermingled, have been able to hold this line for the past half-hour. The 3d Battalion 4th Infantry, which bore the brunt of the hostile tank attack, and which suffered about thirty per cent casualties, is now reorganizing along Jordan Creek. The 1st Tank Company has had eight tanks disabled.

The 1st Battalion 4th Infantry, 1st Battalion 1st Engineers, Company A 1st Antitank Battalion, 1st Platoon 1st Tank Company, and Company A 901st Chemical Regiment are in division reserve south of New Market.

(2) *Enemy.*—Major General A is aware that the following enemy movements were taking place at 10·15 AM (see Special Map A)·

(a) Hostile infantry accompanied by several tanks was moving southeast across country with the leading elements crossing Bear Creek.

(b) Infantry was moving south across country near Franklin S.H.

(c) Artillery in the vicinity of Mt. Bethel Ch. was beginning to displace forward.

3. FIRST REQUIREMENT.—The decision of Major General A at 10:30 AM, 7 June.

NOTES

1. Sunrise is at 4:55 AM; sunset at 7:40 PM.
2. Private property will not be entered.
3. No trucks are available for troop movements.
4. Solutions will be turned in at crossroads 767-H (Burrus S.H.) at 3:00 PM.

SECTION II

Second Special Situation

	Paragraph
A solution of the first requirement	4
Second requirement	5

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4. A SOLUTION OF THE FIRST REQUIREMENT.—At 10:30 AM, Major General A decides to withdraw from action at once to a defensive position east of Bee Creek * * * in order to secure the bridges over the Platte River between Edgerton Junction

and Mellon Bridge for the 2d Division and to permit the 1st Division to reorganize for offensive action.

5. SECOND REQUIREMENT.—So much of the plan of the 1st Division for the operation as would be contained in paragraphs 2 and 3 of a complete written field order pertaining to the following *only:*

a. Covering force(s) operating under division control.

b. Infantry brigades, to include *only* the time of withdrawal and any prescribed manner of breaking contact (that is, unless the withdrawal is to be made simultaneously, the order in which the elements in contact will withdraw).

c. The main line of resistance (including organized extensions) of the new position to be defended, and the boundary between brigades thereon (show in *red* on Special Map A).

NOTES

1. Assume that fragmentary orders can reach front-line units in one hour.
2. Use a terrain exercise pad for solution of requirements 5 *a* and 5 *b*; place solution of requirement 5 *c* on Special Map A.
3. Solutions will be turned in at the eastern exit of Woodruff by 5:00 PM.

SECTION III

A Solution of the Second Requirement

Paragraph
A solution of the second requirement 6

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6. A SOLUTION OF THE SECOND REQUIREMENT.—*So much of the plan of the 1st Division for the operation as pertains to the items listed in the requirement:*

a. Covering force.—The 1st Battalion 4th Infantry
Attached:
1st Battalion 1st Engineers
1st Platoon 1st Tank Company
Company A 1st Antitank Battalion
Company A 901st Chemical Regiment
to move at once to the vicinity of road junction 770-H, cover the withdrawal of the 2d Brigade and hold the enemy west and south of Hardesty Branch until ordered to withdraw. 2d Battalion 1st Field Artillery, moving at once via New Market to road junction 701-J, to be attached upon arrival thereat.

b. The infantry brigades.—The 1st Brigade to withdraw from the left commencing at once; the 2d Brigade to withdraw at 1:00 PM.

c. The main line of resistance and boundary between brigades.—See Overlay No. 1.

SECTION IV

Discussion

	Paragraph
Purpose	7
General	8
Mission	9
Plans open to the 1st Division	10
Decision	11
Plan of withdrawal	12
Boundary between brigades on new position	13

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7. PURPOSE.—The purpose of this terrain exercise is to illustrate a daylight withdrawal from action by a reinforced division which has suffered heavy losses from a wide envelopment by a superior force and which has not adequate reserves to maintain its position during the remaining hours of daylight.

8. GENERAL.—*a.* When the situation developed late in the afternoon of 6 June, Major General A estimated the enemy strength to be a division. He then decided to take up the active defense on the position held by the 1st Brigade at dark 6 June, with a view to launching a counteroffensive with the 2d Brigade. A successful counteroffensive might have enabled him to continue his advance on St. Joseph. Had he assumed a passive defense it would have amounted to a temporary relinquishment of his mission.

b. Developments after nightfall indicated that strong enemy reinforcements in motors were moving against him from Atchison.

c. The 2d Brigade, moving to an area on the south flank to launch the counteroffensive, lost direction and, through misunderstood orders, was committed prematurely shortly after daylight. It suffered heavily from the enemy attack, which was accompanied by tanks; by 10:30 AM, it had been driven back from 1000 to 2000 yards, and was barely able to hold its ground. Enemy reserves accompanied by tanks are continuing to envelop the south flank. Another enemy force is moving south across

country near Franklin S.H. It may move east and strike the right flank of the 2d Brigade, or it may continue to the south.

d. The 1st Brigade has been able to hold its ground except on the east flank, where one battalion has been driven back to the regimental reserve line. The timely arrival of a reserve battalion checked the enemy advance, and the regimental reserve line is intact.

e. The division reserve is located near New Market.

f. The 1st Brigade has one battalion of infantry not yet committed which has been ordered to the vicinity of Strafford.

g. The divisional light artillery is divided equally between the two brigades. The howitzer regiment less one battalion supports the 2d Brigade.

h. Major General A now has information that leading elements of the 2d Division will reach the Platte River between Edgerton Junction and Mellon Bridge, both inclusive, about 11:00 PM, 6 June.

9. MISSION.—It is evident that the 1st Division cannot now carry out its original mission until reinforced It must hold the enemy in check until, with the 2d Division. it can assume the counteroffensive. It must not yield ground unnecessarily, and it must not risk destruction.

10. PLANS OPEN TO THE 1ST DIVISION.—*a.* If the 1st Division attempts to hold its present position during the ten hours of daylight remaining, it risks destruction. The 1st Brigade is holding its original position except on the right flank. It has only one battalion not engaged, and cannot render any assistance to the 2d Brigade. The 2d Brigade is in a critical situation. Strong enemy reserves, which are already crossing Bear Creek, threaten to envelop the left of the 2d Brigade, while a smaller enemy force, moving south from Franklin S.H., can envelop the right of the brigade. Its only reserve is reorganizing after suffering severe casualties, and cannot be counted upon for further action for some time. The brigade has been driven back for approximately a mile, but has been able to hold for the past half-hour. The enemy has begun to displace his artillery; it can be assumed that he will renew his frontal attack on the 2d Brigade, in conjunction with the enveloping force now crossing Bear Creek, as soon as the bulk of the artillery is in position.

b. If the division attempts to extend its left flank with its reserves, the enemy is still strong enough to continue to envelop that flank. If the 1st Brigade uses its reserve to block the gap

of 4000 yards existing between the brigades, it will not be able to offer a strong resistance. The division is actually committed to a battle on two fronts, in which it is extended over thirteen miles.

c. A counterattack is not feasible because the means are insufficient.

d. A daylight withdrawal behind the Platte River should enable the division to break contact with the enemy, reorganize, and hold until the 2d Division arrives. The Platte River is an obstacle which the enemy should have difficulty in crossing. The 2d Division will reach the line of the Platte River between Edgerton Junction and Mellon Bridge about 11:00 PM tonight. The renewal of the offensive by the 1st and 2d Divisions would require the crossing of the river in the face of enemy resistance, which would render the accomplishment of the mission more difficult.

e. A daylight withdrawal to a position behind Bee Creek will enable the division to reorganize, reconstitute adequate reserves, close the dangerous gap now existing between brigades, and shorten its front. By holding this position, the 1st Division will prevent the enemy artillery from firing on the bridges over which the 2d Division must cross. Bee Creek, although fordable, is a formidable obstacle against tanks and presents difficulties to attacking infantry. The position is a strong one.

11. DECISION.—Major General A's decision should be to withdraw at once to a position east of Bee Creek and secure the bridges over the Platte River between Edgerton Junction and Mellon Bridge (both inclusive), until the arrival of the 2d Division.

12. PLAN OF WITHDRAWAL.—*a.* In order to secure the dangerous south flank, check the advance of the Red force now crossing Bear Creek, and cover the withdrawal of the 2d Brigade, which is seriously threatened with envelopment, a covering force should be sent at once to the vicinity of road junction 770-H.

b. The entire division reserve, consisting of the 1st Battalion 4th Infantry, 1st Battalion 1st Engineers, 1st Platoon 1st Tank Company, Company A 1st Antitank Battalion, and Company A 901st Chemical Regiment, should be placed under command of Lieutenant Colonel "1st Battalion 4th Infantry" and ordered to move at once on road junction 770-H, delay the

enemy advance, and hold him southwest of Hardesty Branch until ordered to withdraw.

c. If the enveloping force can be slowed down to a rate of advance of one mile per hour by Blue artillery interdiction fire, it is probable that the Blue covering force can be at least partially deployed on the high ground overlooking Hardesty Branch by the time the enemy reaches that locality.

d. All of the artillery with the 2d Brigade is badly needed at this time. It can best assist the immediate needs of the covering force by delaying the hostile enveloping force. It would be a mistake to displace any of it at this time. Although the covering force can be supported with difficulty by some guns on the new position, its action cannot be foreseen, and it may have to maneuver, therefore, the covering force will eventually need attached artillery. As the left of the 1st Brigade begins its withdrawal at once, the 2d Battalion 1st Field Artillery is available for attachment to the covering force. The battalion, moving at the trot, should be in position to support the covering force by the time that force is established on its position.

e. The 1st Brigade must withdraw from left to right as soon as orders can reach front-line elements. It is only by this maneuver that a follow-up can be prevented which, by pressure from the east or south flank, might cut off the withdrawal. In view of the threat from the enemy force moving south near Franklin S.H., the reserve battalion of 1st Brigade should be ordered to the vicinity of crossroads 504-J. When the left of the brigade has withdrawn to the vicinity of road junction 544-H, the 2d Brigade can begin its withdrawal without endangering the 1st Brigade. This time will probably be about 1:00 PM.

f. The 2d Brigade, although hard pressed, must hold its position until about 1:00 PM in order to enable the 1st Brigade to withdraw. The enemy artillery is now displacing, which will give the brigade a breathing spell before another attack can be launched with maximum artillery support. The artillery in support of the 2d Brigade must not withdraw until the brigade begins its withdrawal. Reconnaissance details will begin to reconnoiter at once for positions on the new position.

13. BOUNDARY BETWEEN BRIGADES ON NEW POSITION.—*a.* The principal enemy threat at this time is against the Blue south flank. The 1st Brigade has held its ground successfully except on the east flank, and reserves have checked the enemy

attack on that flank. On the new position, the 2d Brigade will probably continue to be hard pressed. For this reason, it should be given a shorter sector of responsibility. The 1st Brigade can be extended over a much broader front because the danger of envelopment or penetration is less on its front. If Jordan Creek is included in the sector of the 2d Brigade and the boundary is extended to the rear to road junction 813-J (to the 1st Brigade) —Mellon Bridge (to the 2d Brigade), the 2d Brigade will be able to reorganize and pinch out reserves with which to extend its south flank if necessary. The 1st Brigade, with a front of some 10,000 yards, will require four or five battalions in line, and one or two in reserve to extend its flank.

b. The distance of the withdrawal varies between three and six miles. If the enemy follow-up can be slowed down to one mile per hour, it is probable that the enemy will not be able to drive home a coordinated attack on the Bee Creek position before dark.

Section 6

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Section 7

READERS' GUIDE AND SUBJECT INDEX

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Z

List of Periodicals Indexed and Key to Abbreviations

A Med Bul—Army Medical Bulletin

A Ord—Army Ordnance

A Quar—Army Quarterly (Great Britain)

Bul Belge Mil—Bulletin Belge des Sciences Militaires (Belgium)

Can Def Quar—Canadian Defence Quarterly (Canada)

Cav Jour—Cavalry Journal

Cav Jour [GB]—Cavalry Journal (Great Britain)

Chem War—Chemical Warfare Bulletin

CA Jour—Coast Artillery Journal

FA Jour—Field Artillery Journal

Ftg Forc—Fighting Forces (Great Britain)

Inf Jour—Infantry Journal

Jour RAMC—Journal of the Royal Army Medical Corps (Great Britain)

Jour R Art—Journal of the Royal Artillery (Great Britain)

Jour RUSI—Journal of the Royal United Service Institution (Great Britain)

Jour USII—Journal of the United Service Institution of India (Great Britain—India)

Kraft—Kraftfahrkampftruppe (Germany)

MC Gaz—Marine Corps Gazette

Mil Mitt—Militärwissenschaftliche Mitteilungen (Austria)

Mil-Woch—Militär-Wochenblatt (Germany)

Mil Eng—Military Engineer

Mil Surg—Military Surgeon

Nav Inst Proc—Naval Institute Proceedings

Pion—Pioniere (Germany)

QM Rev—Quartermaster Review

Res Off—Reserve Officer

Rv l'Air—Revue de l'Armée de l'Air (France)

Rv d'Art—Revue d'Artillerie (France)

Rv de Cav—Revue de Cavalerie (France)

Rv d'Inf—Revue d'Infanterie (France)

Rv Gen Mil—Revue du Génie Militaire (France)

Rv Mil Gen—Revue Militaire Générale (France)

Rv Mil Suisse—Revue Militaire Suisse (Switzerland)

Riv Art e Gen—Rivista di Artiglieria e Genio (Italy)

RAF Quar—Royal Air Force Quarterly (Great Britain)

RASC Quar—Royal Army Service Corps Quarterly (Great Britain)

Roy Eng Jour—Royal Engineers Journal (Great Britain)

RTC Jour—Royal Tank Corps Journal (Great Britain)

SC Bul—Signal Corps Bulletin

US Rev—United Services Review (Great Britain)

Ws & Wr—Wissen und Wehr (Germany)

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Capital ships vs. air attack. (Can Def Quar—Jul 1937)
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The use of heavy transport aircraft in army maintenance. (Jour USII—Apr 1937)
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Britain can win the armaments race. (US Rev—13 May 1937)
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Life in the Aleutin Islands. (Nav Inst Proc—Jul 1937)

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The military ideas of King Albert during the World War. (Bul Belge Mil—Feb 1937)

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Five horses—and a devil. (Cav Jour—Mar-Apr 1937)
Greek horsemanship and horsemastership. (Cav Jour—Mar-Apr 1937)
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Mechanized columns in Spain. (A Quar—Jul 1937)
The International Situation: The Spanish Civil War. (Jour RUSI—May 1937)
Sky fire in Spain. (Res Off—Apr 1937)
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Tanks in the Spanish War. (RTC Jour—Jul 1937)
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SOUTH AMERICA

CHACO WAR (1932-1935)

Tank experiences in the Chaco War. (RTC Jour—Jan 1937)

UNITED STATES

CIVIL WAR (1861-1865)

Smoke at Gettysburg. (Cav Jour—Mar-Apr 1937)
Longstreet—General Lee's war-horse. (QM Rev—May-Jun 1937)

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The question of war guilt. (Mil Mitt—Jan 1937)
Twenty years ago: The entry of the United States into the World War. (Mil-Woch—16 Apr 1937)
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E—General Military History

The German Official History, 1916. Vol. X (Verdun and the Somme, 1916). (A Quar—Jul 1937)
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The German offensives in March and April 1918, from the British point of view. (Mil-Woch—14 May 1937)
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G—Arms and Services

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The participation of the cavalry of the Egyptian Expeditionary Corps in the conquest of Palestine. (Ws & Wr—Mar 1937)

Chemical Service

A chemical officer at the front. (Chem War—Jul 1937)

Engineers

The Austro-Hungarian fortifications during Conrad v.Hötzendorf's time. (Mil Mitt—Jan 1937)
The fight for river lines during withdrawals. (Pion—Feb 1937)

Infantry

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An American World War hospital centre in France. (Mil Surg—May 1937)
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Lord Kitchener's attitude towards the tanks. (RTC Jour—Jan 1937)
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The British tanks at the Battle of Cambrai. (Rv de Cav—Jan-Feb 1937)
German tanks in the World War. (Rv d'Inf—Feb 1937)
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The tanks at Cambrai. (A Ord—Jul-Aug 1937)
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J—Campaigns and Battles

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Dardanelles (Gallipoli) Front

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The first battle of Kut. (Mil Eng—Jul-Aug 1937)

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Two cavalry episodes in the Palestine Campaign, 1917-1918. (Cav Jour [GB]—Jan, Apr 1937)
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Machine guns in battle. (A Quar—Jul 1937)
The day before Cantigny. (Cav Jour—Mar-Apr 1937)
The counterattack. Action of the 4th Squadron, 10th Chasseurs, on May 31, 1918. (Cav Jour—May-Jun 1937)
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